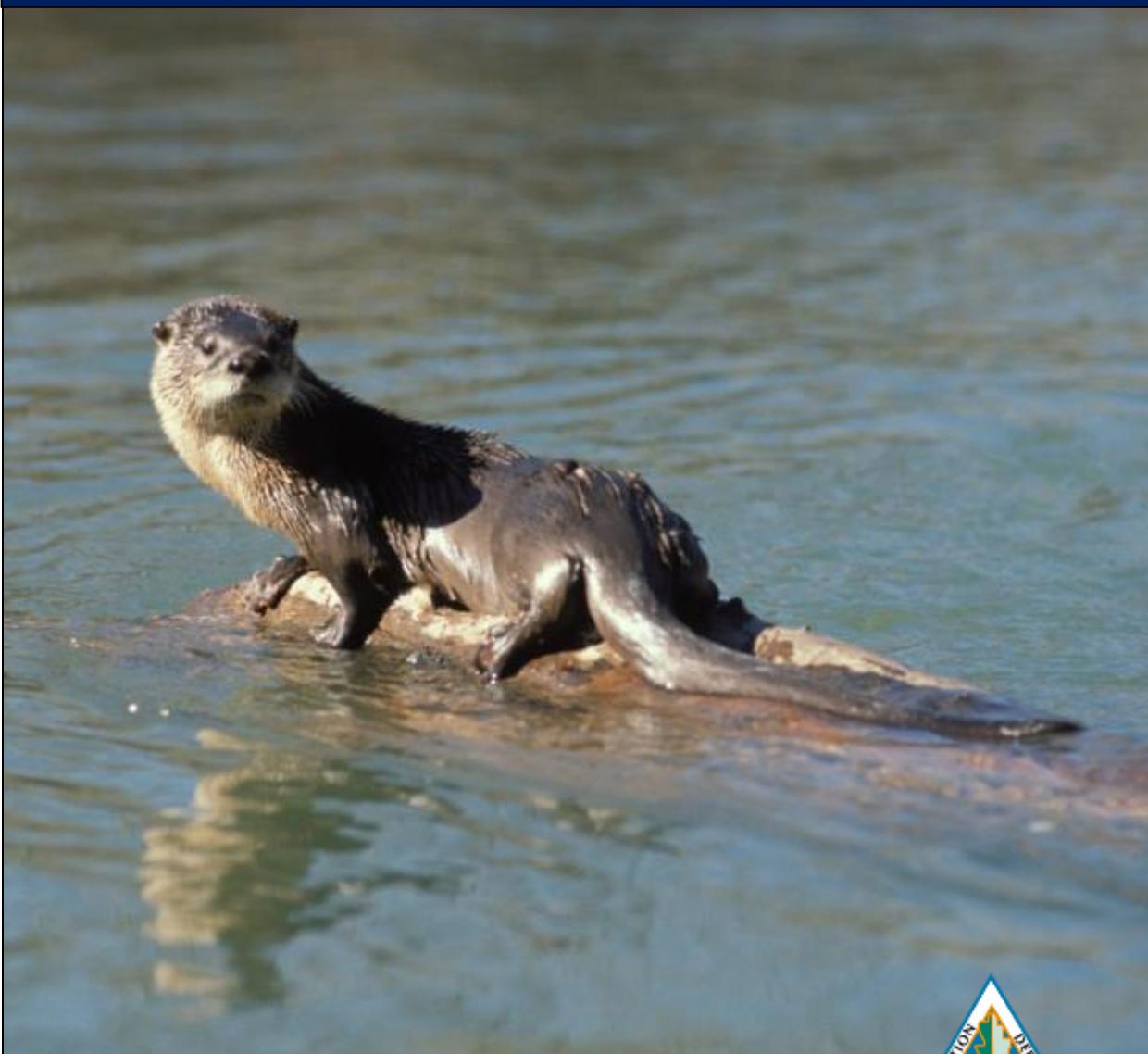


2017 FURBEARER PROGRAM ANNUAL REPORT

MISSOURI DEPARTMENT OF CONSERVATION



RESOURCE SCIENCE DIVISION



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ANNUAL HIGHLIGHTS

- ❖ Record low fur prices were documented at the annual auction in Montgomery City, MO for the third year in a row. Price declines however, seem to be leveling off compared to trends from previous years.
- ❖ Opossums were especially healthy this year with two separate individuals harvesting record breaking Virginia opossums. The previous record of 14 lbs. 12 oz. was shattered by 1 lb. 6.6 oz.; the new record tipped the scale at 16 lbs. 2.6. oz.
- ❖ The Mountain Lion Response Team (MLRT) confirmed DNA from a female mountain lion in Shannon County. This is the first definitive confirmation of a female mountain lion being present in Missouri since 1994. To date, reproduction has not been detected in Missouri.
- ❖ All reports, on the order of hundreds each year, of mountain lions are submitted to and recorded by the MLRT. A total of 3,025 reports have been submitted since 1994; the 3,000th report was received and recorded in May of 2017. Of the more than 3,000 reports, 283 of these have been formally investigated resulting in 69 confirmations.
- ❖ In addition to research efforts, MDC records black bear sightings and have received nearly 2,500 sighting reports since 1992 with the 2,000th report recorded in Summer 2016.



INTRODUCTION

Missouri's wild fur market has been monitored annually since 1940, with some information dating back as far as 1934. Over time, tremendous fluctuations in the harvest of Missouri's primary furbearing animals have been observed as both market and social trends changed. Missouri Department of Conservation (MDC) monitors the fur market within the state using mandatory fur dealer transaction records, mandatory pelt registration of bobcats (since 1980) and river otters (since 1996), and information gathered at fur auctions. The information in this report is based on the harvest by both trappers and hunters.

The number of Fur Dealer Permits issued by MDC peaked at 1,192 during the 1945-46 trapping and hunting season. In 2017, MDC issued **44 Resident Fur Dealer Permits**, the same as was issued in 2016, and **6 Non-Resident Fur Dealer Permits**, double the number issued in 2016.

Permits to harvest furbearers by trapping methods were first required in Missouri in 1953. The number of Resident Trapping Permits issued peaked during 1980-81 at 13,248 and reached an all-time low in 2000 at 2,050 permits issued. During the 2016-17 trapping season, MDC issued **6,986 Resident** and **355 Non-Resident Trapping Permits**.

Total pelts harvested reached 834,935 in 1940-41 (over 70% were opossum and skunk pelts), and reached the second highest peak in 1979 at 634,338 when average raccoon pelt values were estimated at \$27.50. The economic value of harvested fur also peaked in 1979-80 at over \$9 million. Pelt values declined dramatically during the late 1980s and through the mid-1990s. As a result, the number of participants also fell to all-time lows. The global fur market for the coming season is looking more promising than in recent years with increased interest in wild fur from China. Although Russia is still largely absent from the global fur market, the increase in Russian currency strength suggests a renewed interest for the coming season (North American Fur Auctions, 2017). Some have suggested the 2015-16 season was the bottom of the current decline and fur markets should begin to climb in the near future (Fur Harvesters Auction Inc.).

In addition to harvest information, wildlife population trends are monitored using observations collected by MDC staff (Sign Station Survey) and bow hunters (Archer's Index). Sign station surveys are conducted each September by MDC staff in 25 counties. Archer's Index is based on annual wildlife observation reports submitted by cooperating bow hunters. A more detailed account of this year's Sign Station Survey and Archer's Index can be found in **Section II** of this report.

Also contained in **Section II** are updates and progress summaries for various furbearer-related research projects, monitoring efforts, and items of interest. **Section II** is for informational purposes and these should be considered preliminary reports. For more information on any of these reports please contact Laura Conlee at laura.conlee@mdc.mo.gov.

SECTION I:

Missouri Furbearer Status 2016-2017



FUR HARVEST COMPARISONS

Individuals interested in buying or selling fur in Missouri (i.e., fur dealers) must obtain a commercial permit from MDC. Permit requirements include maintaining and submitting records of all fur transactions (e.g., buying, selling, retaining inventory, etc.). Data collected from fur dealers provide MDC an estimate of furbearer harvest. Additionally, bobcat and river otter harvest numbers are gathered from mandatory pelt registration, including tagging as required by CITES for export outside the United States.

Pelt prices have steadily declined the last four seasons, resulting in reduced harvest for most species. MDC issued a total of **7,341 trapping permits** for the 2016-17 trapping season, a decrease in number issued from the previous season (Table 1). Fur buyers continue to house high inventories of all species and pelt prices continue to be low; therefore, the 2017-18 season will likely be similar to the last 2-3 years unless the global fur market changes.

Table 1. Furbearer harvest and pelt prices in Missouri over the last three harvest seasons.

Species	2016-17		2015-16		2014-15	
	Pelts sold ¹ or registered*	Pelt Prices from MTA Auctions ²	Pelts sold or registered*	Pelt Prices from MTA Auctions	Pelts sold or registered*	Pelt Prices from MTA Auctions
Raccoon	32,106	\$2.77	34,758	\$5.84	85,497	\$7.75
Opossum	1,176	\$1.74	2,455	\$0.64	4,874	\$1.80
Muskrat	10,205	\$3.60	6,057	\$2.37	13,227	\$5.58
Coyote	6,586	\$12.52	4,419	\$12.18	5,264	\$18.14
Beaver	3,522	\$6.90	1,933	\$10.94	4,228	\$11.11
Mink	356	(m) \$10.71 (f) \$5.00	263	(m) \$10.81 (f) \$9.75	475	(m) \$11.18 (f) \$4.06
Red Fox	587	\$22.75	643	\$16.34	1,093	\$24.81
Gray Fox	293	\$12.33	308	\$15.72	593	\$18.47
Striped Skunk	354	\$5.50	227	-	263	\$3.83
Badger	1	\$18.00	14	-	37	\$32.67
Bobcat*	2,104	\$34.99	2,207	\$34.74	3,229	\$60.08
River Otter*	1,403	\$30.79	1,356	\$25.53	2,173	\$34.97
Trapping permits issued	7,341		7,992		10,197	

¹ Number of pelts sold is based on reports received from 42 Furbuyer Permittees.

² Pelt prices are averaged from all fur sold, including green, finished, and damaged furs.

* Bobcat and River Otter harvest numbers are based on CITES registration.

- No information available.



MISSOURI FUR AUCTION PRICES

The Missouri Trappers Association (MTA) hosts fur auctions each year in the state of Missouri, providing opportunity to buy or sell harvested pelts. In the 2016-17 season, MTA hosted just one auction in February. Pelt prices are averaged from all fur sold, including green, finished, and damaged furs. Overall average pelt prices decreased by nearly 17% from last year (Table 2). Raccoons, beaver, and gray fox exhibited the greatest decrease in average pelt price from last year with 52%, 37%, and 20% decreases, respectively. River otter average pelt price increased by 20% and bobcats remained steady from last year. Declines in pelt prices are not a recent occurrence, but have been on a steady drop since price peaks in 2012. Most pelt prices this year were well below the five-year average (Table 3).



Table 2. Furbearer pelt prices in Missouri from the annual Missouri Trappers Association Fur Auction 18 February 2017, Montgomery City, Missouri.

Species	2016-2017 Summary		Change from 2015-2016	Change from Peak in 2012-2013
	Total Sold	18-Feb		
Raccoon	1,286	\$2.77	-52.6%	-86.7%
Virginia Opossum	25	\$1.74	171.9%	39.2%
Muskrat	1,515	\$3.60	51.9%	-69.5%
Coyote	279	\$12.52	2.8%	-43.8%
Beaver	157	\$6.90	-36.9%	-68.2%
Mink	24	\$9.52	-9.2%	-60.4%
Red Fox	44	\$22.75	39.2%	-41.9%
Gray Fox	21	\$12.33	-20.3%	-63.9%
Striped Skunk	4	\$5.50	-	69.2%
Badger	1	\$18.00	-	*4636.8%
Bobcat	86	\$34.99	0.7%	-69.7%
Otter	86	\$30.79	20.6%	-64.0%

* Change in Badger pelt price is artificially inflated because average pelt price in 2012-2013 was \$0.38 and very few pelts were sold.

- No information available

Table 3. Comparison of average Missouri Trappers Association Fur Auction prices over the last five trapping seasons with a five-year average.

Species	Average Price Per Season					5-year average
	2016-17	2015-16	2014-15	2013-14	2012-13	
Raccoon	\$2.77	\$5.84	\$7.75	\$13.04	\$20.79	\$10.04
Virginia Opossum	\$1.74	\$0.64	\$1.80	\$1.63	\$1.25	\$1.41
Muskrat	\$3.60	\$2.37	\$5.58	\$9.94	\$11.79	\$6.66
Coyote	\$12.52	\$12.18	\$18.14	\$18.12	\$22.26	\$16.64
Beaver	\$6.90	\$10.94	\$11.11	\$14.86	\$21.72	\$13.11
Mink	\$9.52	\$10.47	\$11.18	\$14.81	\$24.05	\$14.01
Red Fox	\$22.75	\$16.34	\$24.81	\$36.24	\$39.13	\$27.85
Gray Fox	\$12.33	\$15.72	\$18.47	\$24.01	\$34.72	\$21.09
Striped Skunk	\$5.50	-	\$3.83	\$2.50	\$3.25	\$3.77
Badger	\$18.00	-	\$32.67	\$17.50	\$0.38	\$17.14
Bobcat	\$34.99	\$34.74	\$60.08	\$120.13	\$115.50	\$73.09
Otter	\$30.79	\$25.53	\$34.97	\$60.57	\$85.53	\$47.48

- No information available





RACCOON HARVEST AND POPULATION TRENDS

Raccoon harvest in 2016-17 totaled 32,106 and included individuals harvested by both trapping and hunting methods (Figure 1). This year's harvest was down 7.63% from last year, which is a less dramatic decline than was observed the previous two years. Harvest is down 62.45% from two years ago, following the trend of pelt price. The 2016-17 season resulted in the lowest raccoon harvest since 1942 and the longest duration of decline in harvest numbers over the last 25 years. Average raccoon pelt prices also continued to decline since the last price peak in the 2012-13 season.



Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. During the hunting season of 2016, bowhunters submitted the number of raccoons observed during archery hunting hours and the number of hours spent afield. Based on these observations, the number of raccoons sighted per 1,000 hours decreased by 34% to 36.6 in 2016 from 55.2 in 2015 (Figure 2). Presence of raccoon tracks at furbearer sign stations also decreased to an index of 183 in 2016, after peaking at 193 in 2015 (Figure 3). Although raccoon abundance data is based on trend information, multiple surveys indicate an overall increasing trend in population abundance. Short-term fluctuations are normal and expected due to the dynamic nature of raccoon populations. Based on harvest and pelt prices of previous trapping and hunting seasons, harvest pressure is expected to, once again, be reduced in the 2017-18 season.

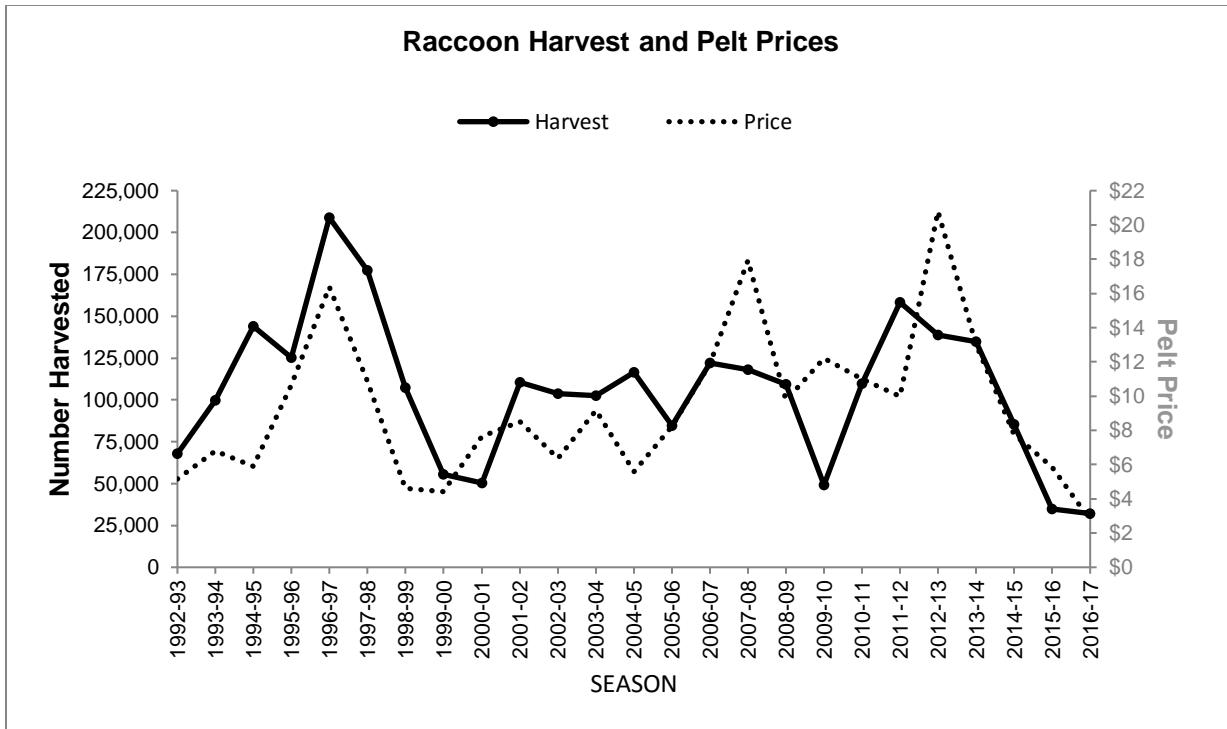


Figure 1. Comparison of Missouri raccoon harvest and pelt prices over the last 25 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.

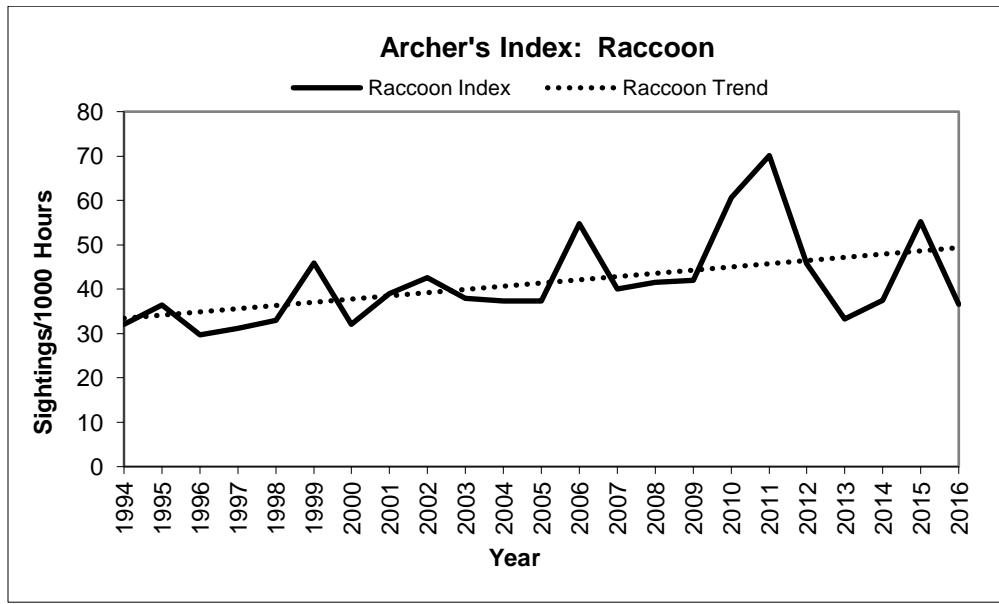


Figure 2. Raccoon population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

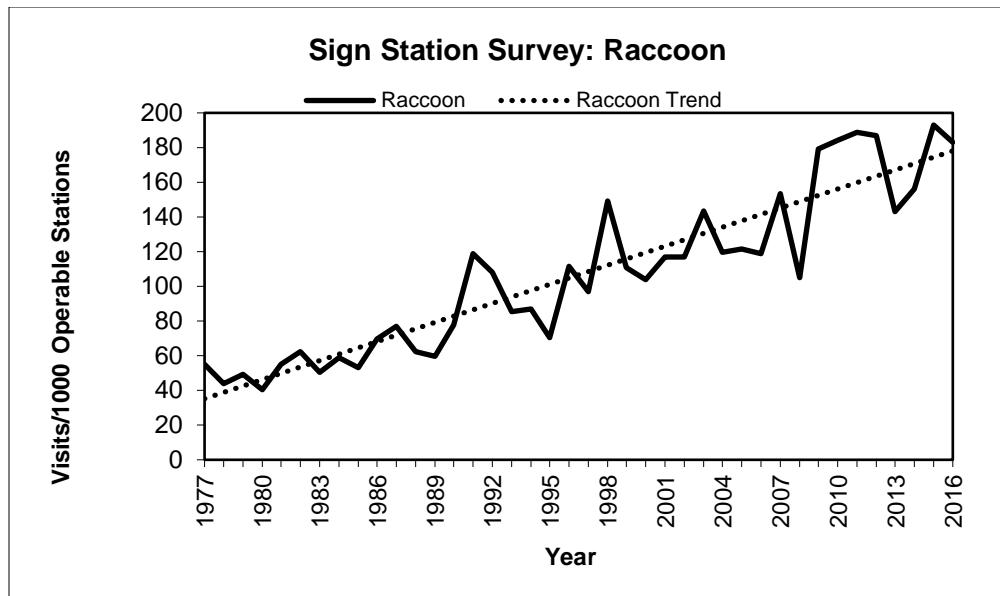


Figure 3. Missouri raccoon population trends based on Furbearer Sign Station Survey Index.





COYOTE HARVEST AND POPULATION TRENDS

Coyote harvest during the 2016-17 furbearer season was up 49% from the 2015-16 season with 6,586 individuals harvested (Figure 4) despite low pelt prices. Predator hunting continues to increase in popularity and survey data suggest over 25,000 people hunt coyotes annually. Although coyote pelt prices averaged only \$12.52 this year, many trappers still enjoy the challenge of catching coyotes and this is reflected in the harvest totals. Additionally, the use of cable restraints has increased opportunity for coyote harvest, supplying both the fur and live markets. Coyote pelts also are becoming increasingly popular as trim for jackets, which may be influencing the local market for this species (North American Fur Auctions).

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Population trend data from the Archer's Index (Figure 5) and sign station survey (Figure 6) for coyotes suggest populations are stable. However, the coyote population appears to be on the increase since the 1970s when the sign station survey began and the early 1980s when the Archer's Index began.



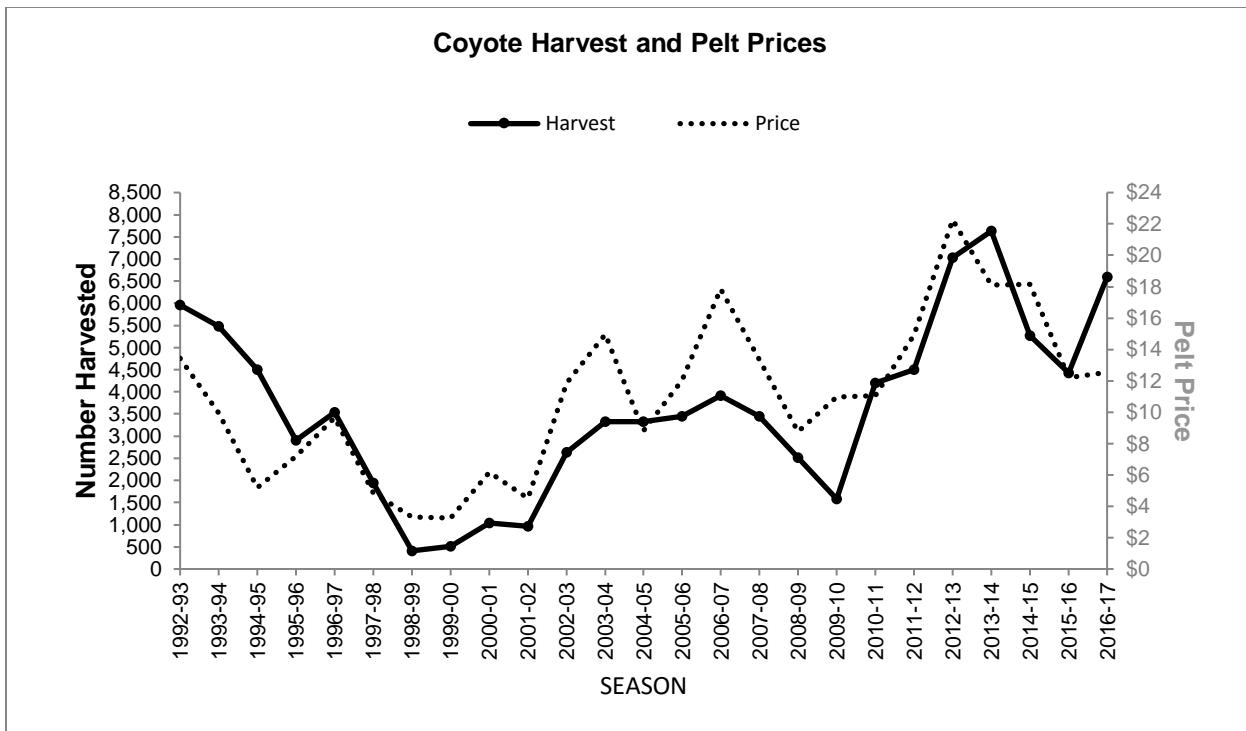


Figure 4. Comparison of Missouri coyote harvest and pelt prices over the last 25 years. Harvest estimates are derived from fur buyer records. Annual pelt price estimates are the average price from the Missouri Trappers Association Fur Auction.

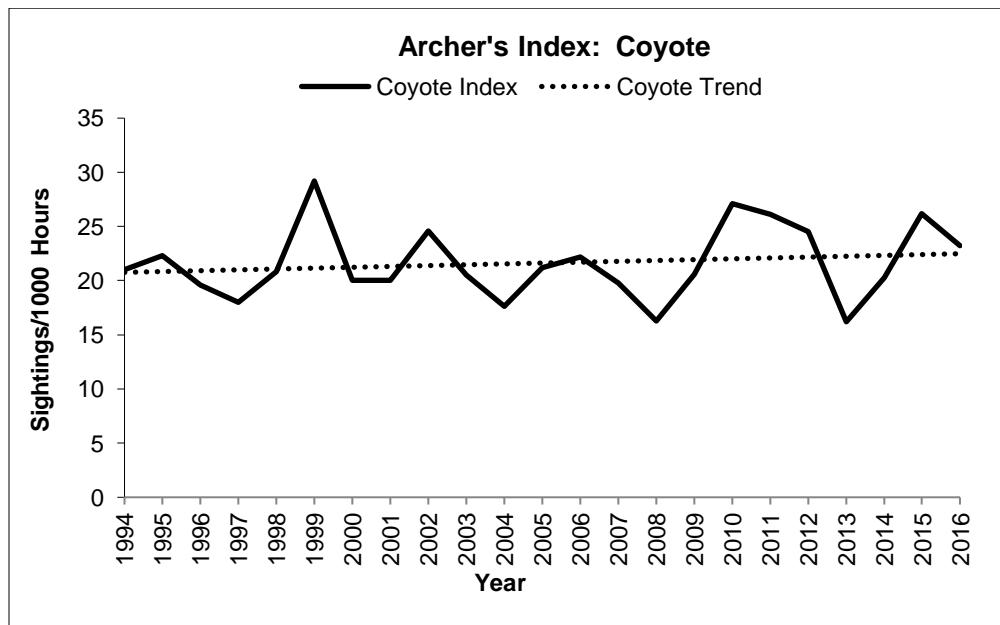


Figure 5. Coyote population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

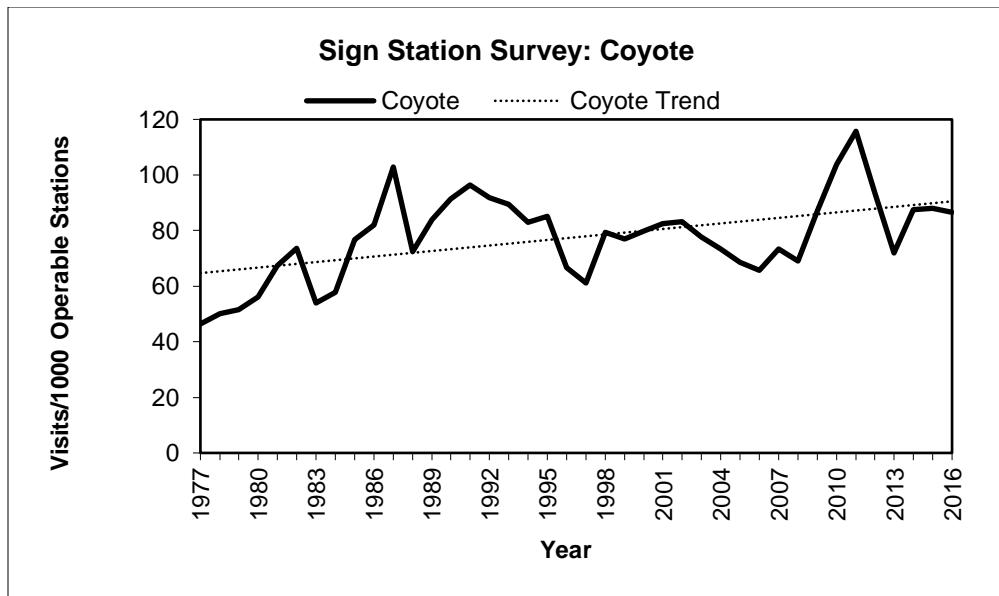


Figure 6. Missouri coyote population trends based on Furbearer Sign Station Survey Index.





FOX HARVEST AND POPULATION TRENDS

Red fox harvest during the 2016-17 season decreased 8.71% from 643 to 587 individuals harvested (Figure 7). **Gray fox harvest** also decreased in 2016-17 by 4.87% to 293 individuals compared with last year's harvest of 308 (Figure 8). Fox harvest is typically a by-product of bobcat or coyote trapper effort. Bobcat pelt prices dropped in 2015-16, and as a result, land trappers were less active resulting in less by-catch of foxes.

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Bowhunter observations and sign station surveys offer a long-term perspective suggesting declines in both red and gray fox populations (Figures 9 and 10). Long-term fox population declines may be the result of interspecific competition with coyotes and bobcats. Another possible strain on gray fox populations is the increasing population of raccoons and the associated distemper virus, for which gray fox may be particularly vulnerable. We continue to observe slight upticks in trend indicators for both red and gray fox around suburban areas where foxes may be seeking refuge from coyotes, but the overall trend is still in decline.

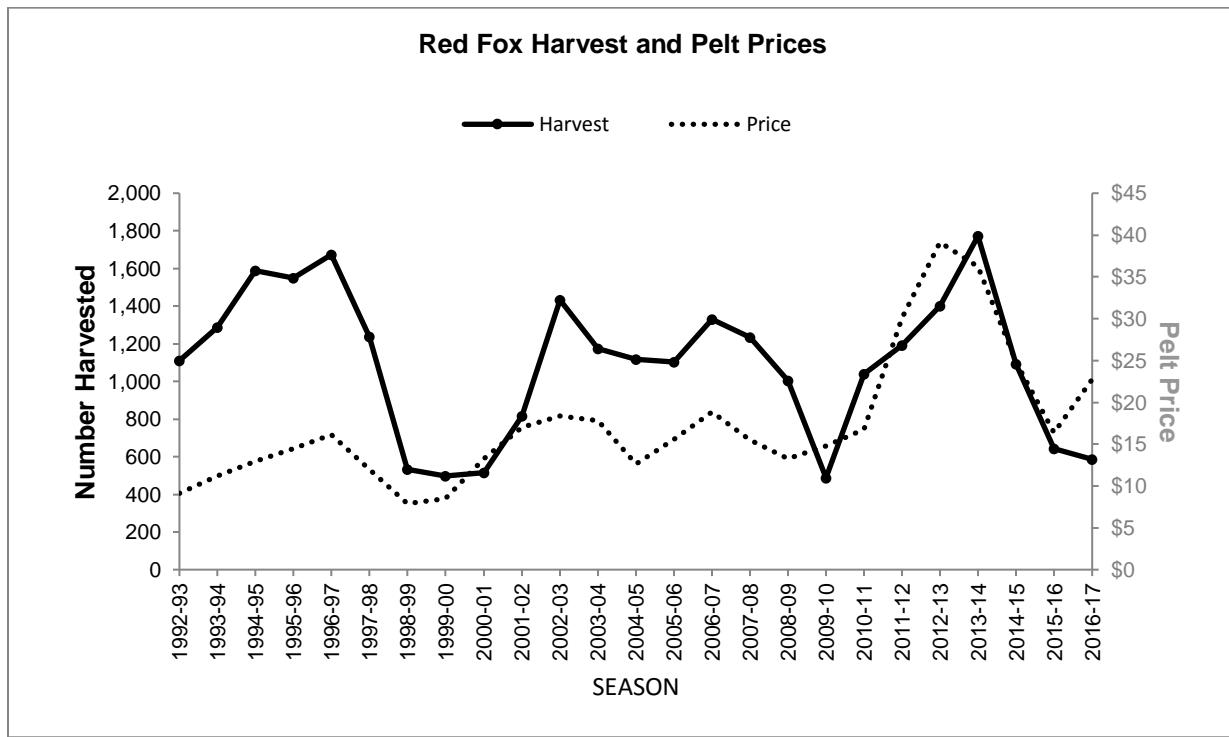


Figure 7. Comparison of Missouri red fox harvest and pelt prices over the last 25 years.

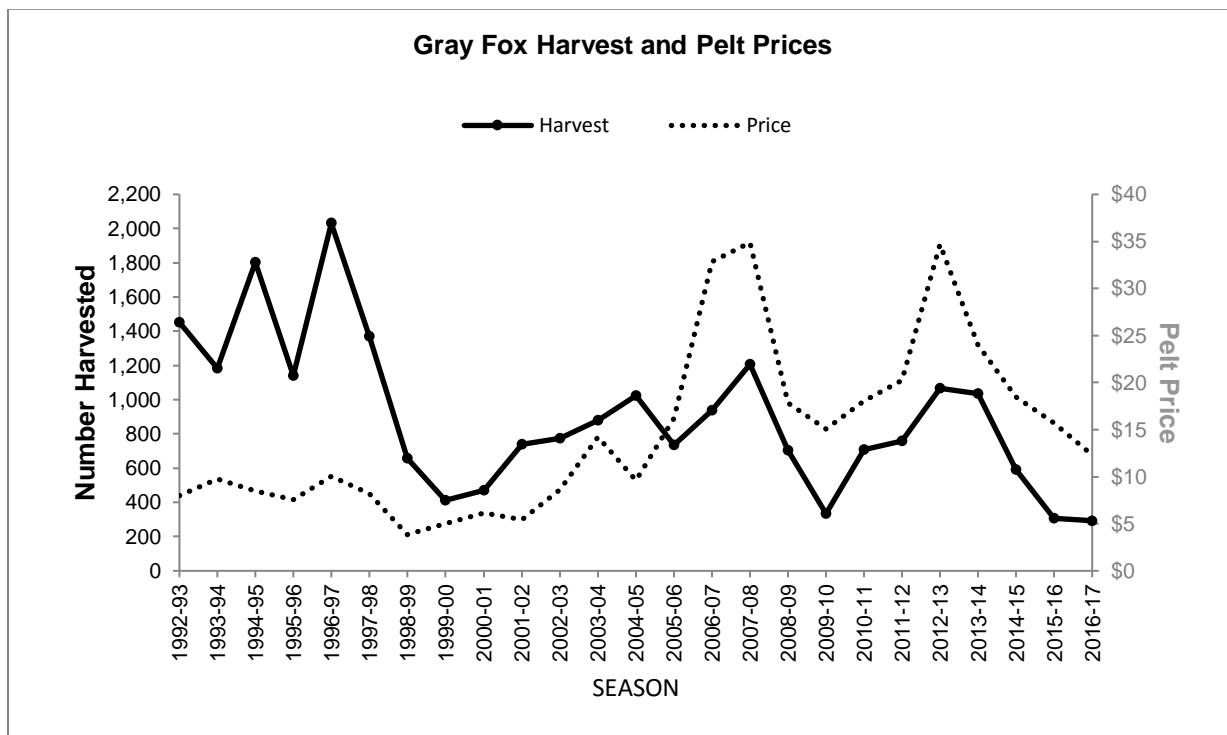


Figure 8. Comparison of Missouri gray fox harvest and pelt prices over the last 25 years.

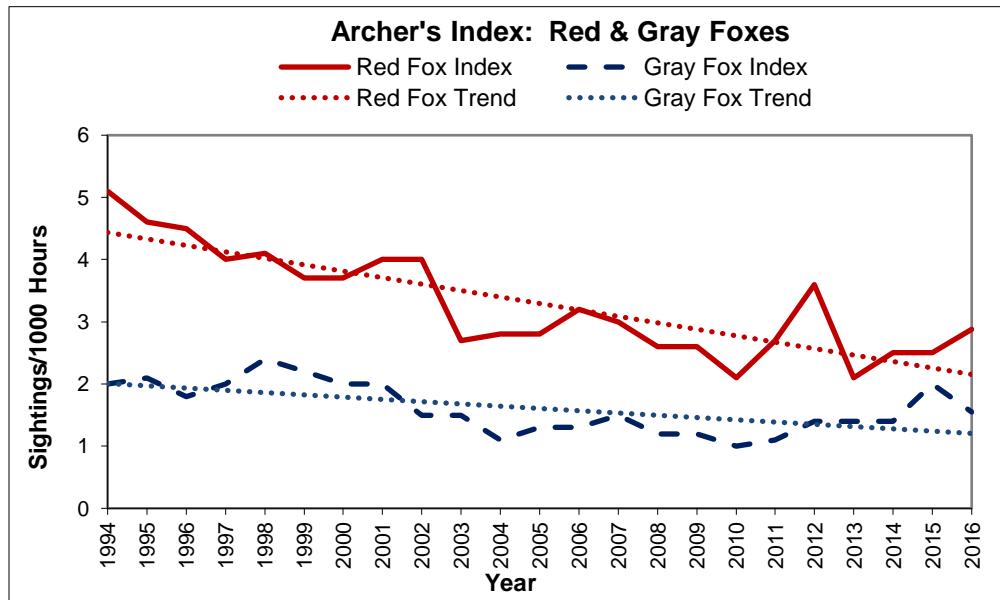


Figure 9. Missouri fox population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

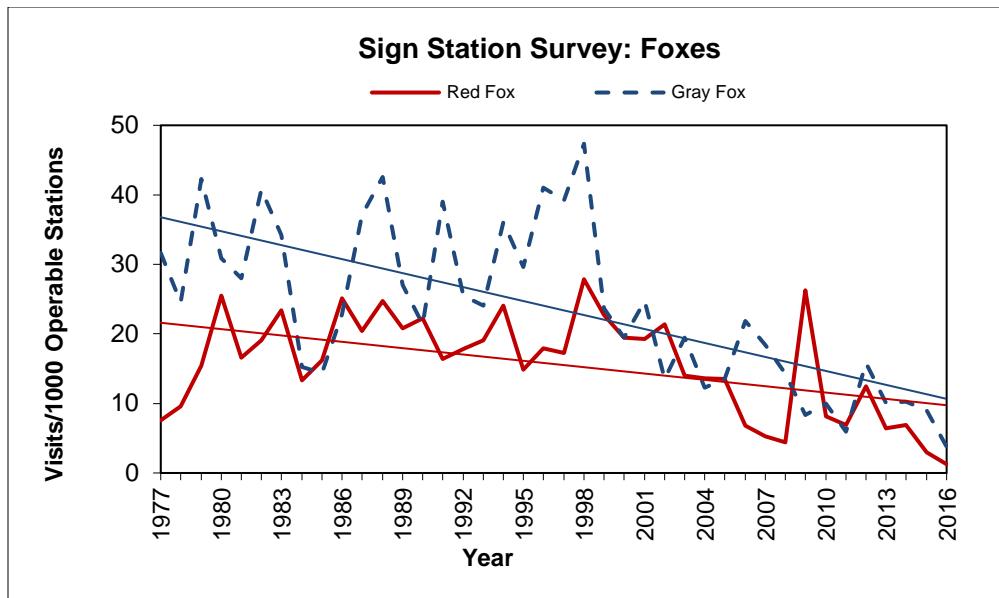


Figure 10. Missouri fox population trends based on Furbearer Sign Station Survey Index.





BOBCAT HARVEST AND POPULATION TRENDS

Bobcat harvest during the 2016-17 season was down 4.67% from 2015-16, and 34.84% below the 2014-15 season harvest (Figure 11), with **2,104 bobcats** harvested. Prices during 2016-17 remained steady from the previous year and slightly fewer bobcats were harvested. Trappers and hunters are required to check or register bobcat carcasses or green pelts at MDC offices or with Conservation Agents. The number of bobcat pelts purchased by fur dealers (1,148) was significantly less than those registered by trappers and hunters as required by CITES (2,104). Instead of selling to fur buyers, trappers may make more money selling carcasses to taxidermists or selling mounted bobcats. The decline in harvest and in the number of bobcat pelts purchased by fur dealers is also likely attributed to a poor global fur market.

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Both sign station survey and Archer's Index data suggest bobcat populations may have dipped over the last couple years; however, the overall trend appears to be stable (Figures 12 and 13).

Geographic distribution of harvest varies by county and method. Vernon County had the highest total harvest (Figure 14) and trapping harvest (Figure 15), while Harrison and Miller Counties had the highest hunter harvest (Figure 16).



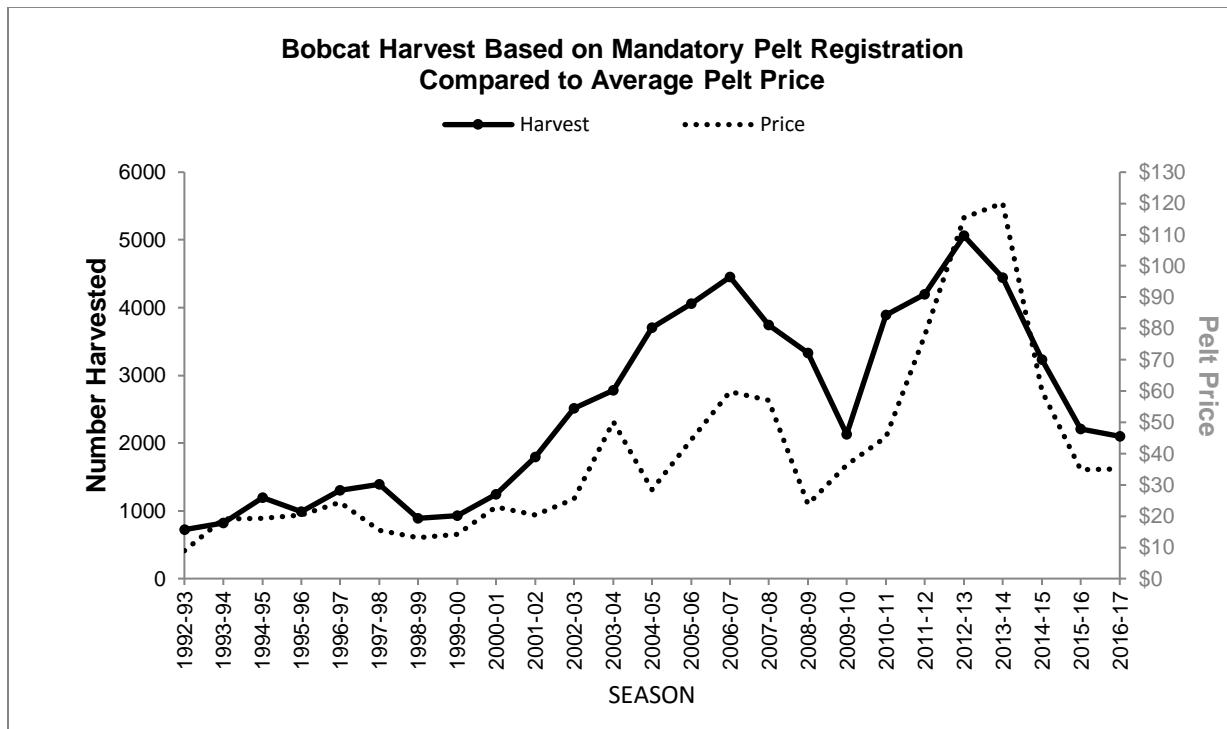


Figure 11. Missouri bobcat harvest trends over the last 25 years compared to average pelt prices.

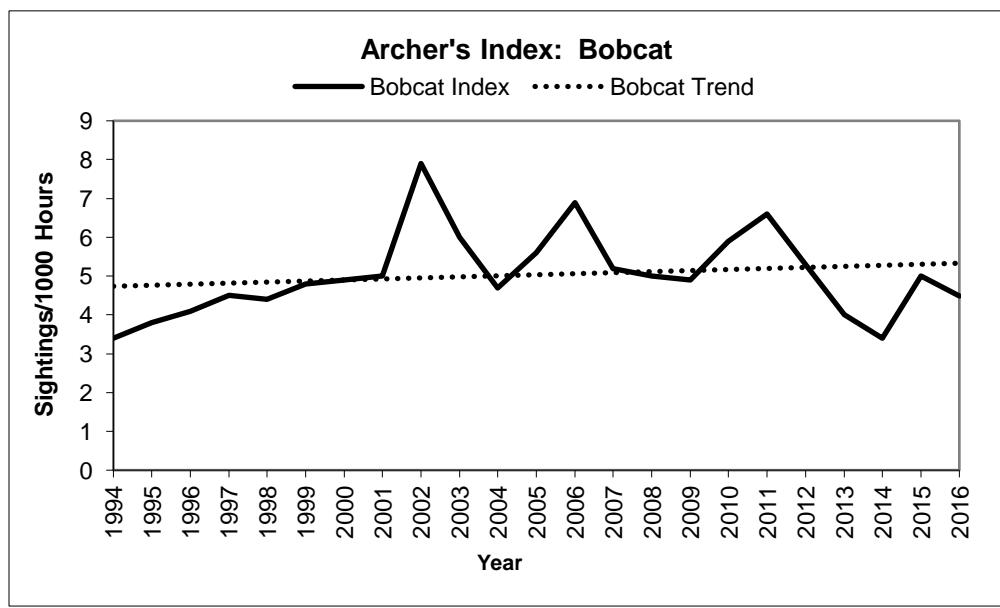


Figure 12. Missouri bobcat population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

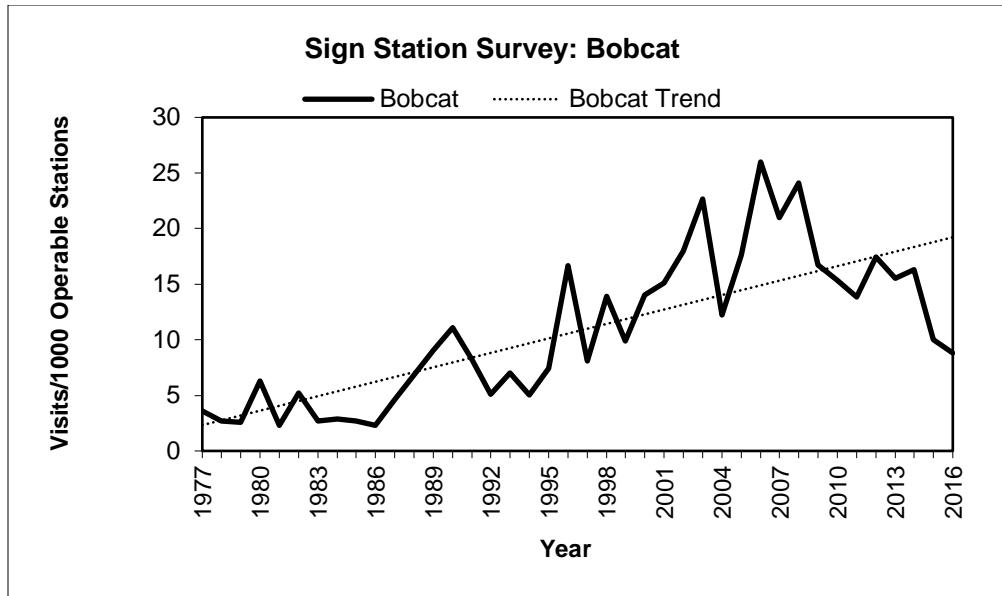


Figure 13. Missouri bobcat population trends based on Furbearer Sign Station Survey Index.



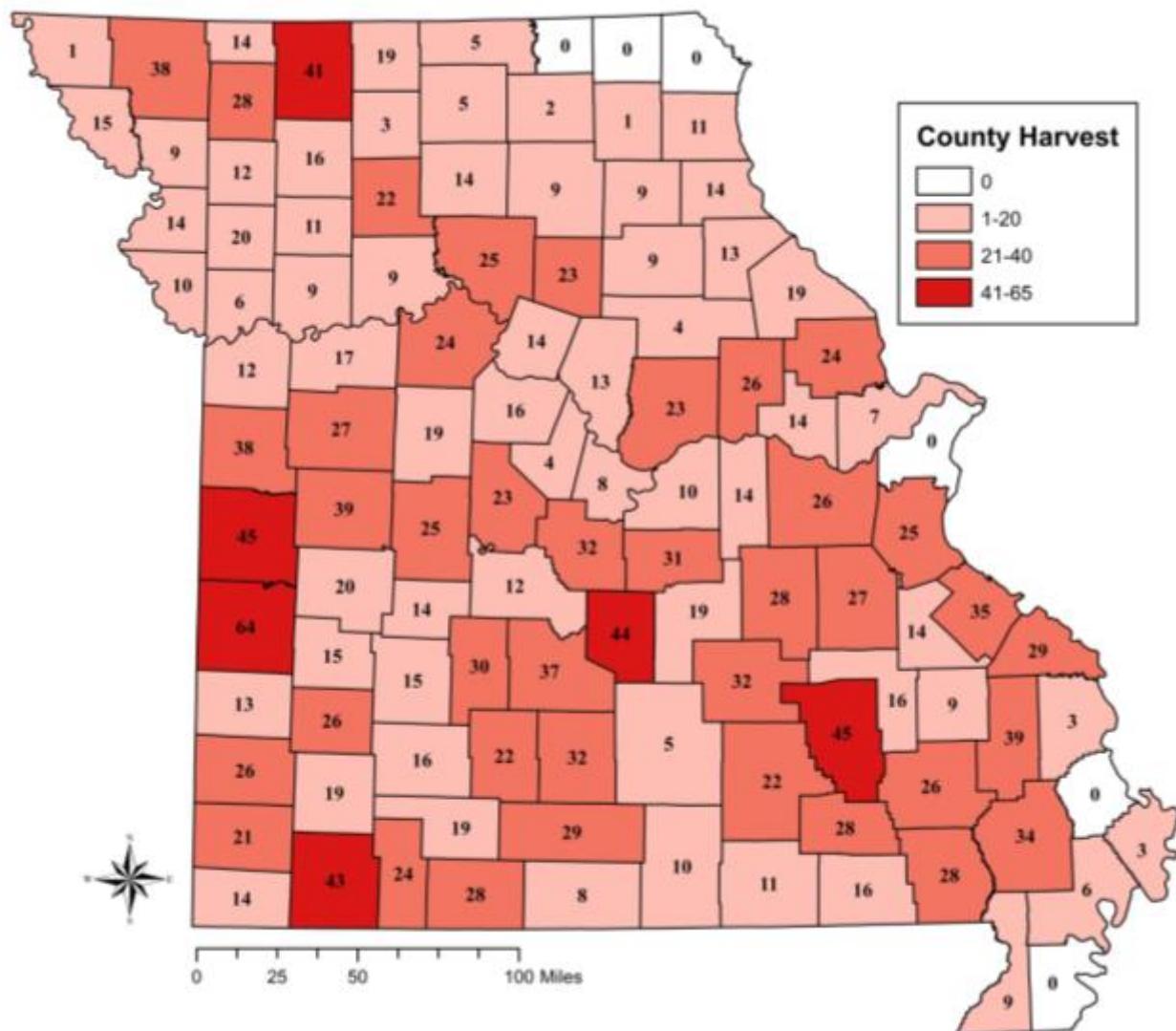


Figure 14. Number of Missouri bobcats harvested per county during the 2016-17 season.

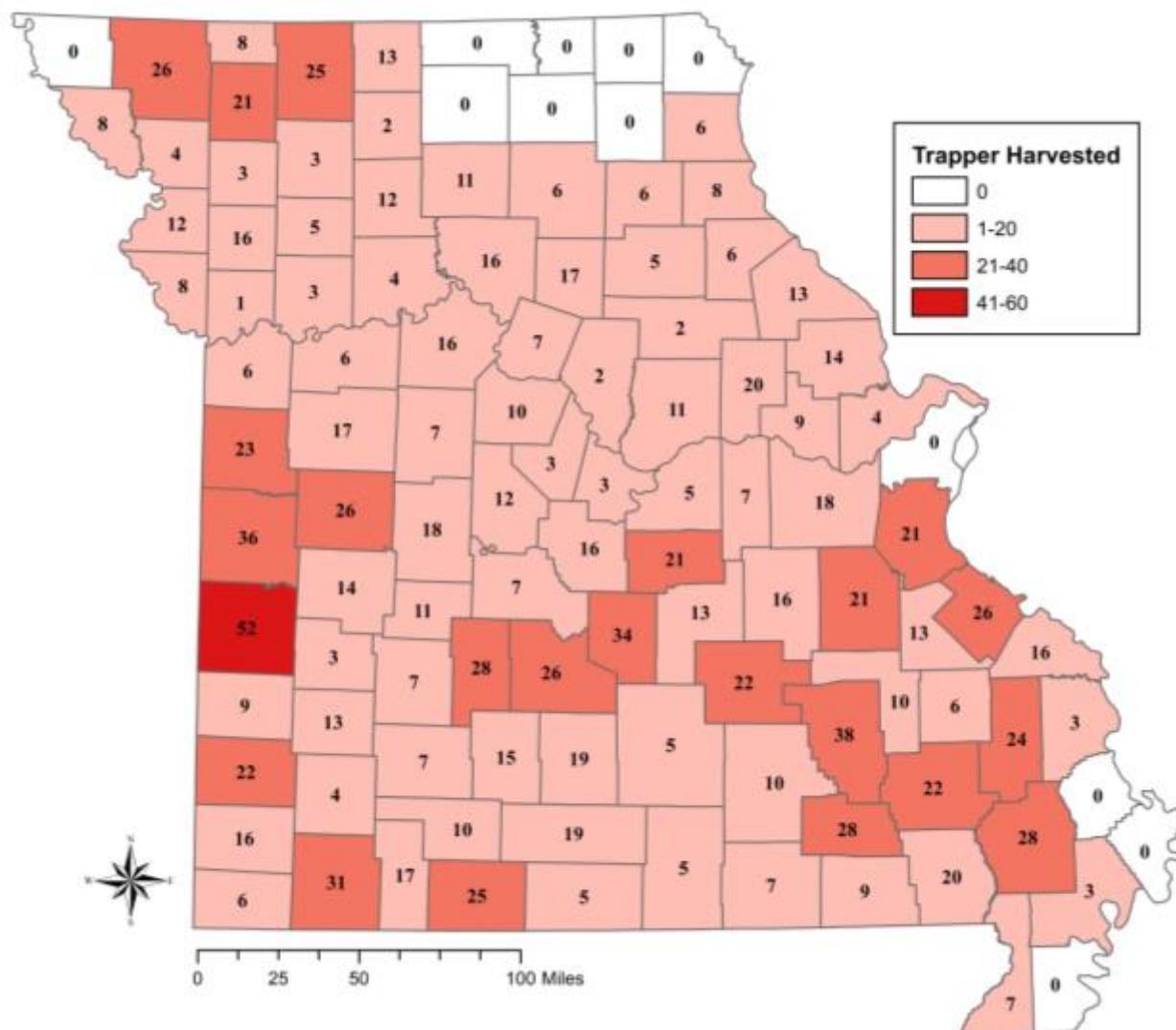


Figure 15. Number of Missouri bobcats harvested by trapping methods per county in 2016-17 season.

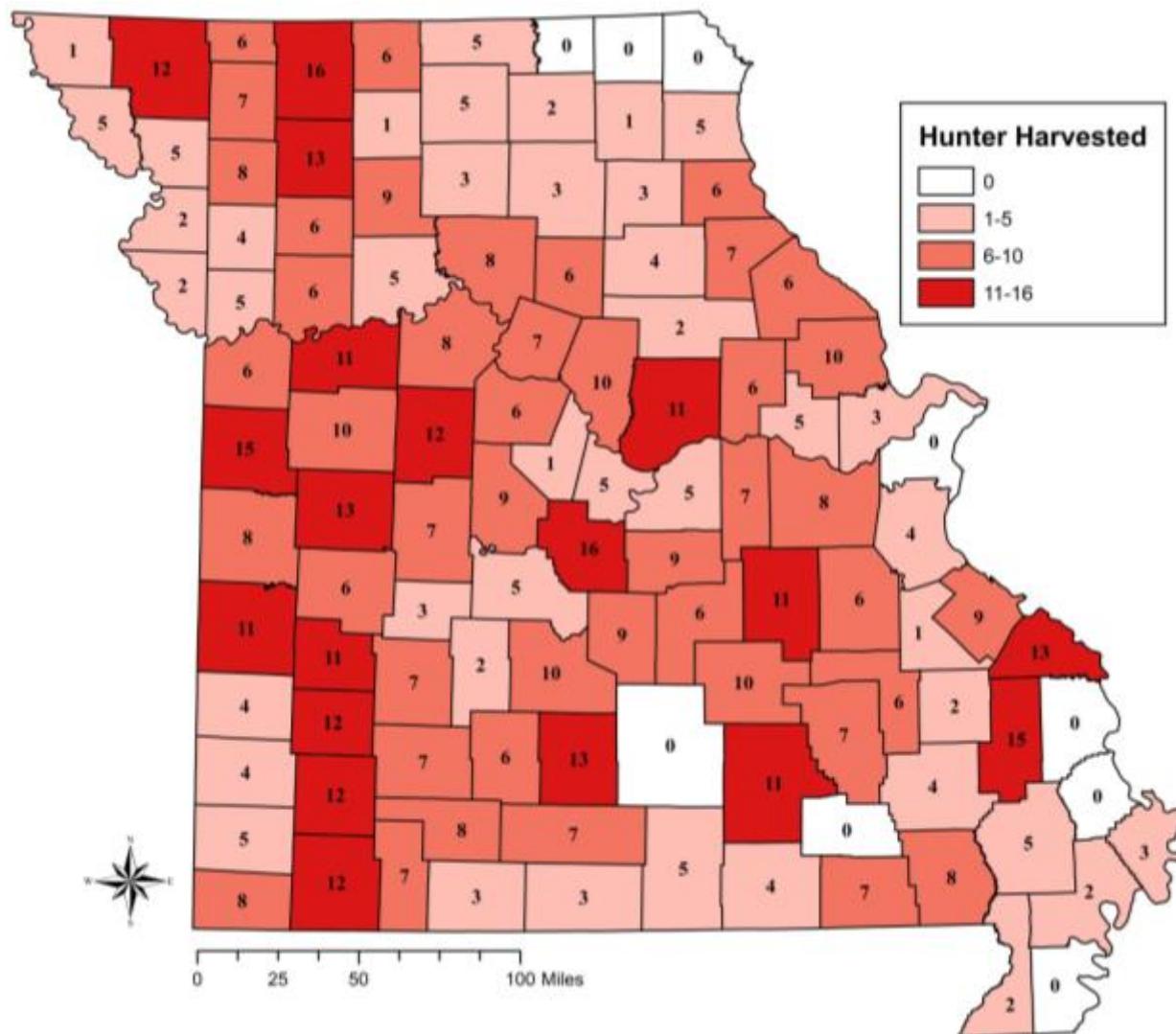


Figure 16. Number of Missouri bobcats harvested by hunting methods per county in 2016-17 season.



RIVER OTTER HARVEST

River otter harvest for the 2016-17 furbearer season was **1,403 river otters**, up 3.47% from last year, but down 35.43% from the 2014-15 season. River otter pelt prices increased 20.6% from last year reflecting increased interest for river otter pelts in China (North American Fur Auctions, 2017). The recent 2 years of low harvest can be attributed to the steady decline in pelt prices and the low, but minor increase in pelt prices during the 2016-17 season (Figure 17). Trappers are required to check or register river otter carcasses or green hides at MDC offices or with Conservation Agents in accordance with requirements by CITES for exportation outside of the United States. The majority of trappers take between 1 and 5 river otters.

River otter harvest was highest in Henry, Chariton, and Shelby counties with more than 50 individuals harvested in each of these three counties (Figure 18). Harvest in Henry and Chariton counties was also highest in the 2015-16 season. Opportunity to harvest river otter from impoundments (i.e., ponds and lakes) and rivers or streams is abundant in Missouri, but a majority (921) of river otters is harvested from streams (Figure 19), while about a third of the harvest was from an impoundment in 2016-17 (Figure 20). River otter harvest during the 2016-17 season was highest in the Missouri River, Grand River, Chariton River, Osage River West, and Blackwater River watersheds (Figure 21). Approximately 33% of the total harvest was taken from these five watersheds (Table 4). River otters harvested from an undeclared watershed were combined into one category of “unknown” (Table 4) and comprised nearly 12% of the total harvest.



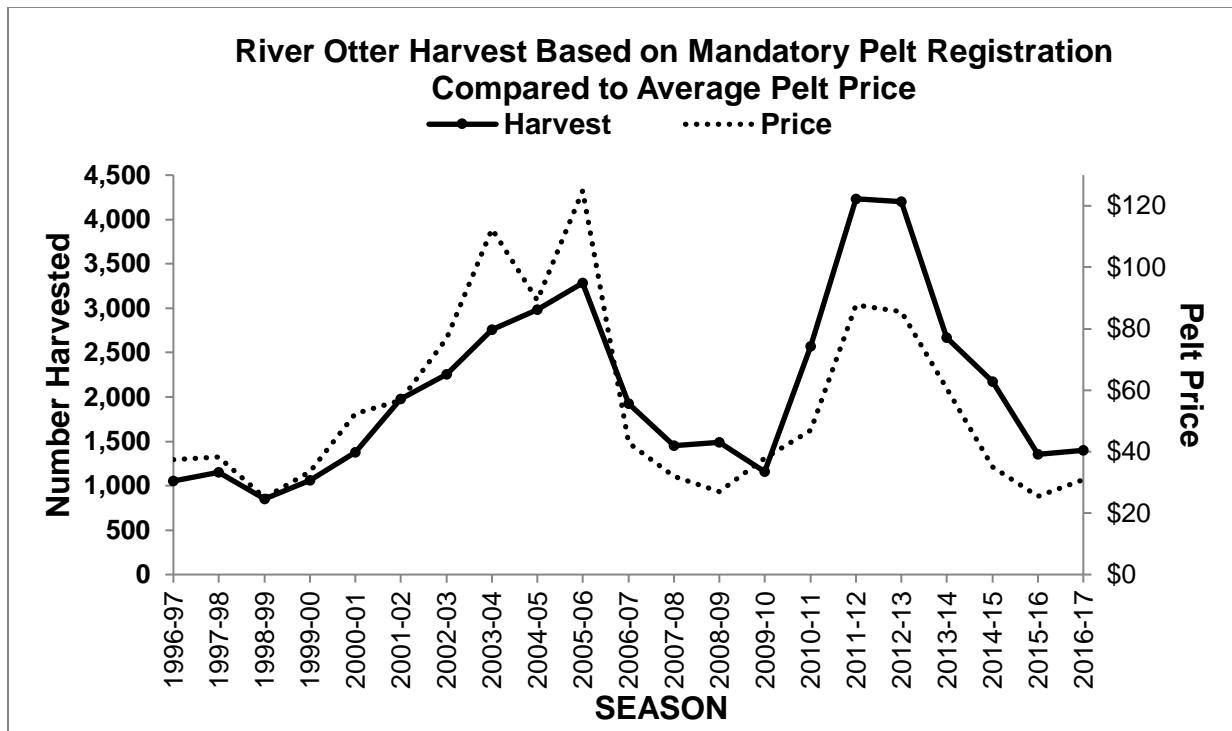


Figure 17. Missouri river otter harvest and average pelt prices from 1996 to 2017.



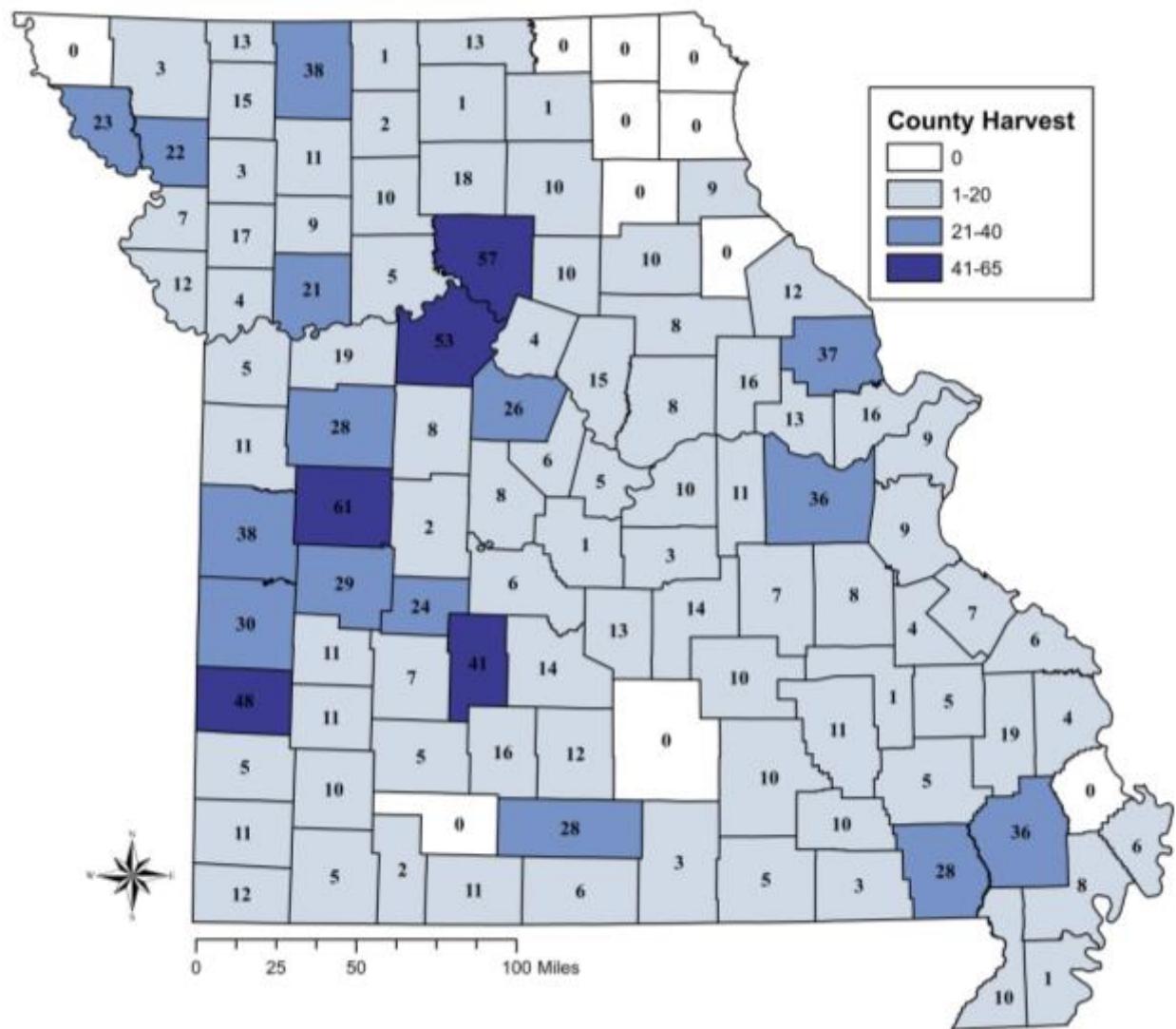


Figure 18. Number of Missouri river otters harvested in each county during the 2016-17 season.

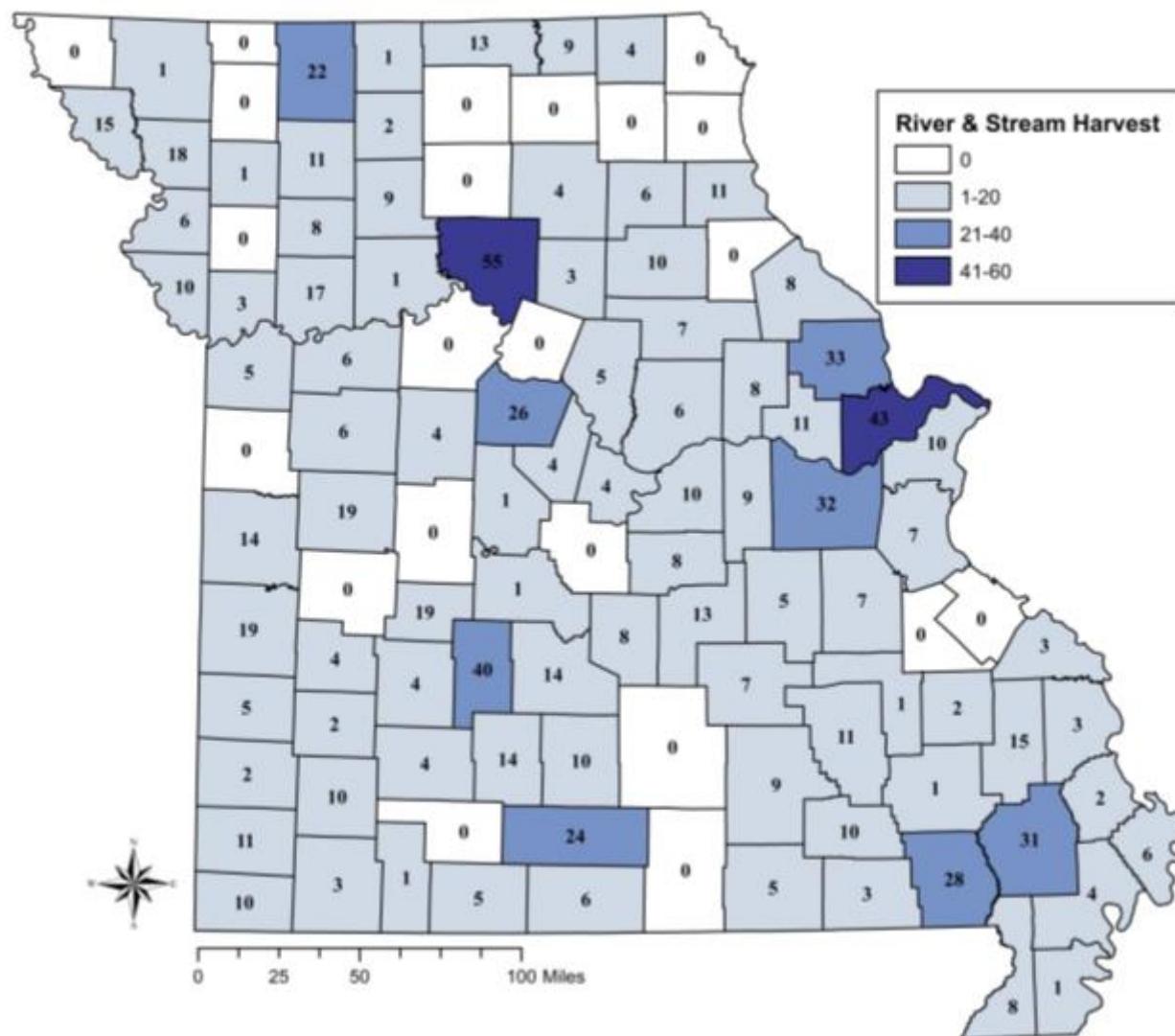


Figure 19. Number of Missouri river otters harvested from rivers or streams per county during 2016-17 season.

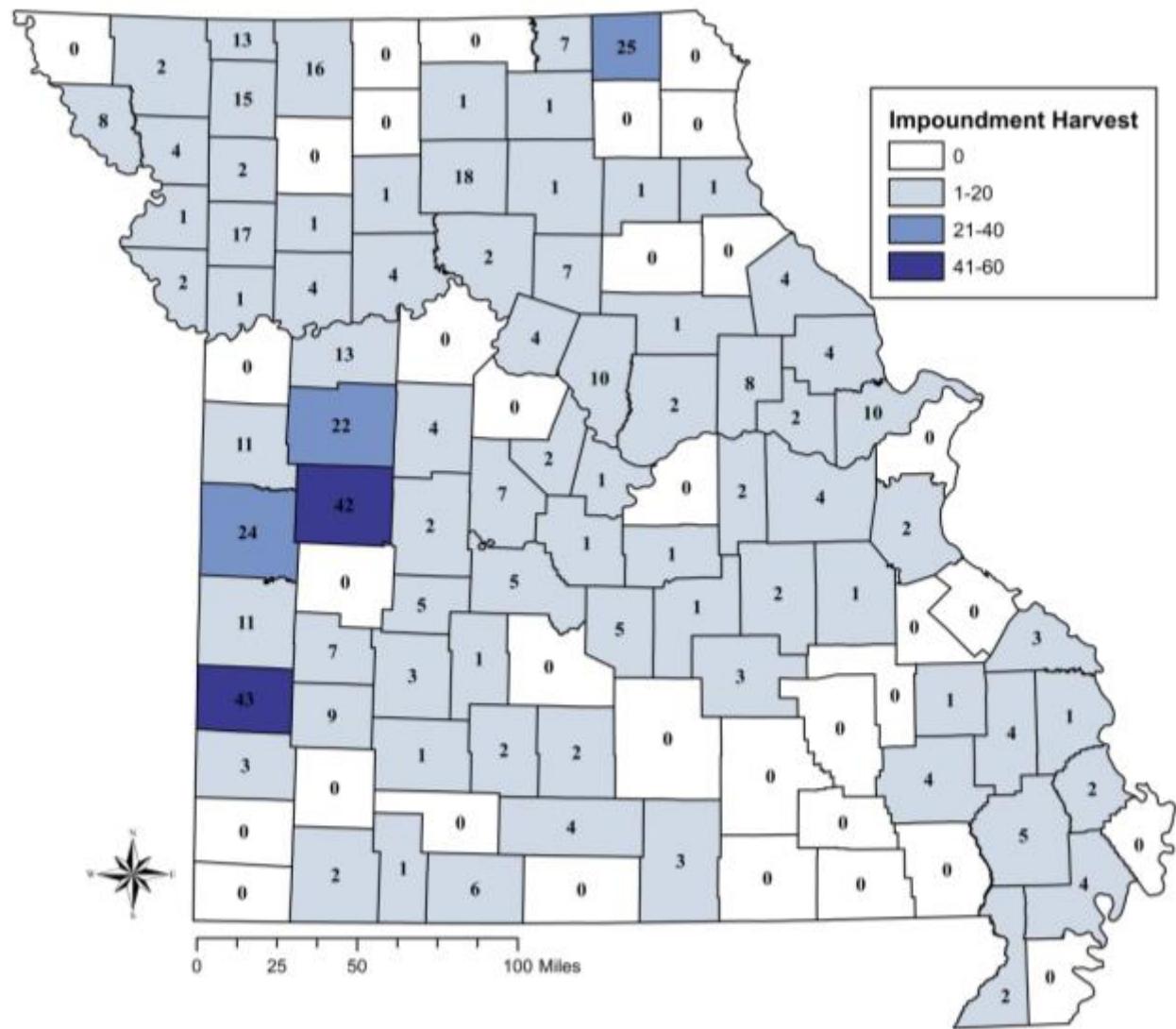


Figure 20. Number of Missouri river otters harvested from impoundments (i.e., ponds or lakes) per county during 2016-17 season.

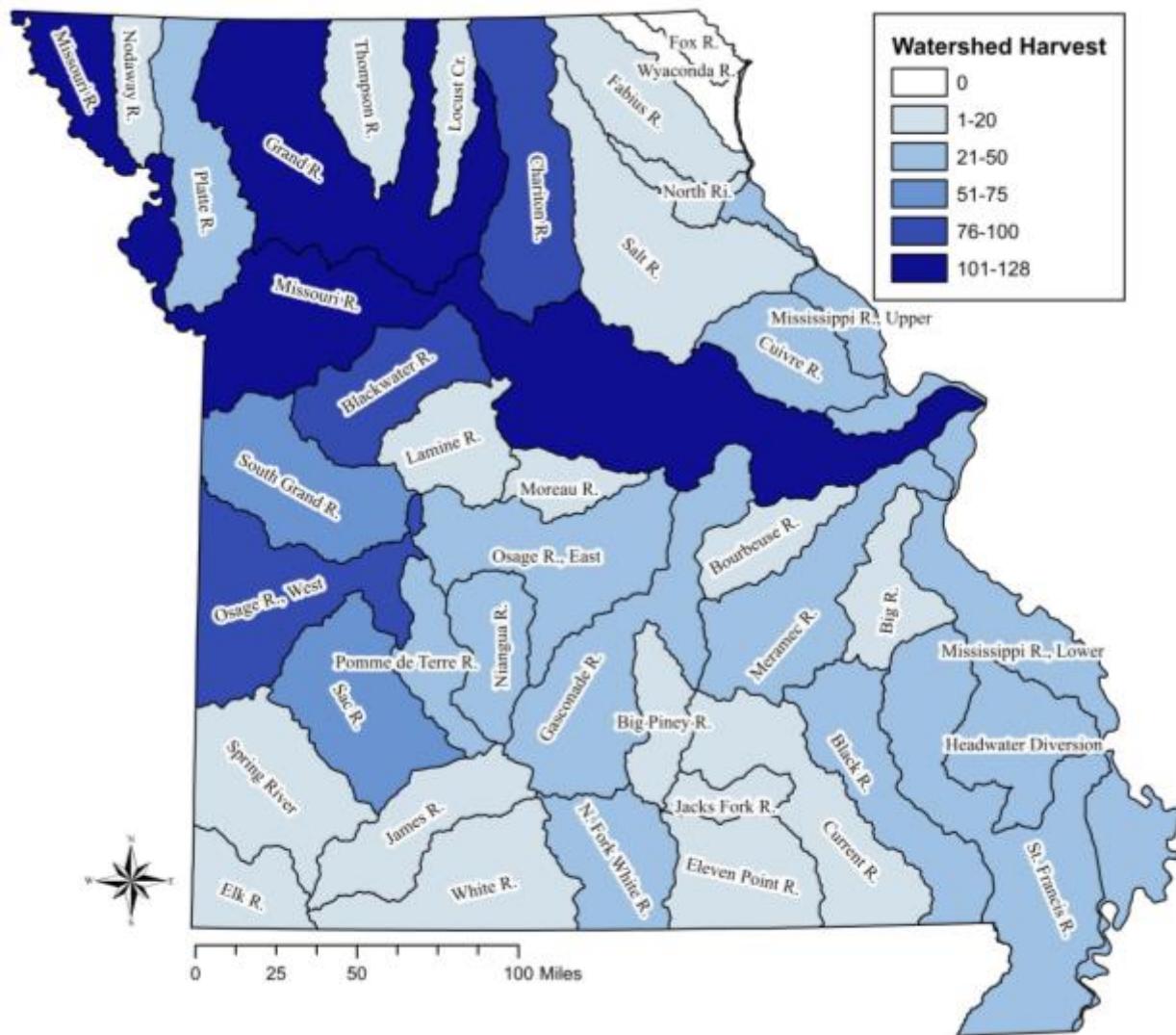


Figure 21. Missouri river otter harvest distribution among watersheds during the 2016-17 trapping season.

Table 4. Missouri river otter harvest distribution among watersheds during the 2016-17 trapping season.

Watershed	Number Harvested	Percent of Harvest
Big Piney River	5	0.36%
Big River	15	1.07%
Black River	45	3.21%
Blackwater River	76	5.42%
Bourbeuse River	8	0.57%
Chariton River	80	5.70%
Cuivre River	34	2.42%
Current River	9	0.64%
Eleven Point River	8	0.57%
Elk River	14	1.00%
Fabius River	1	0.07%
Fox River	0	0.00%
Gasconade River	50	3.56%
Grand River	101	7.20%
Headwater Diversion	25	1.78%
Jacks Fork River	6	0.43%
James River	8	0.57%
Lamine River	17	1.21%
Locust Creek	16	1.14%
Meramec River	32	2.28%
Mississippi River (lower)	24	1.71%
Mississippi River (upper)	26	1.85%
Missouri River	128	9.12%
Moreau River	9	0.64%
N. Fork White River	33	2.35%
Niangua River	50	3.56%
Nodaway River	4	0.29%
North River	7	0.50%
Osage River East	31	2.21%
Osage River West	86	6.13%
Platte River	27	1.92%
Pomme de Terre River	28	2.00%
S. Grand River	72	5.13%
Sac River	56	3.99%
Salt River	20	1.43%
Spring River	16	1.14%
St. Francis River	46	3.28%
Thompson River	7	0.50%
White River	16	1.14%
Wyaconda River	0	0.00%
Unknown	167	11.90%
Total Harvest	1,403	100%



MUSKRAT AND BEAVER HARVEST AND POPULATION TRENDS

Muskrat and beaver harvest continues to fluctuate in somewhat predictable ranges. Since 1990 muskrat harvests have varied from about 5,000 – 20,000 (Figure 22) and beaver from 2,000 – 10,000 (Figure 23). Historically, muskrat numbers have fluctuated widely; however, habitat degradation has limited populations and subsequently reduced harvest. Beavers are a longer-lived species and less vulnerable to depredation; harvest rates are more likely related to pelt values. Trappers harvested 10,205 muskrats (Figure 22) and 3,522 beavers (Figure 23) during the 2016-17 season. Increased interest from China in muskrat has boosted demand and prices for muskrat this year. Beaver is still an important item for hatters, which will help the market for this species (North American Fur Auctions, 2017).

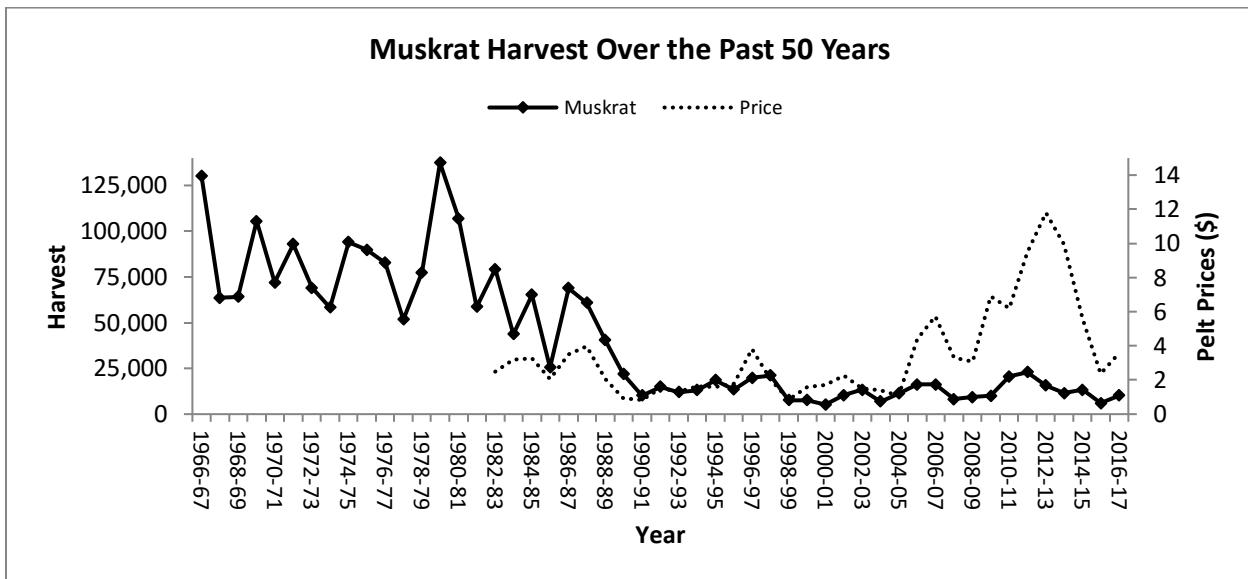


Figure 22. Comparison of Missouri muskrat harvest and pelt prices over the last 50 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.

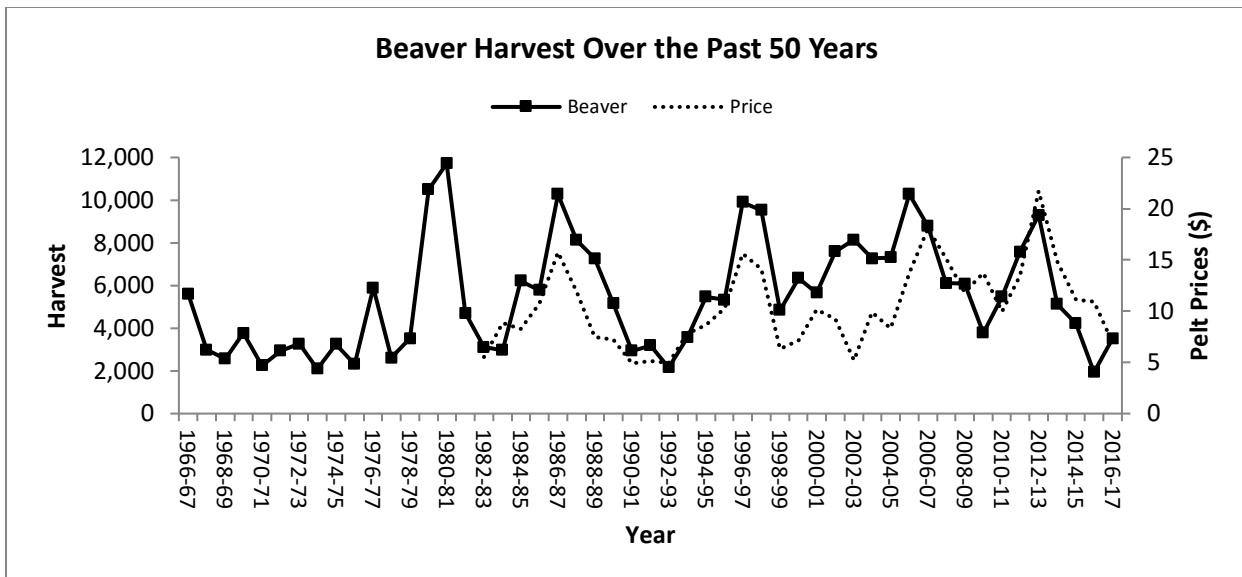


Figure 23. Comparison of Missouri beaver harvest and pelt prices over the last 50 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.





AMERICAN BADGER STATUS IN MISSOURI

The American badger is a native, but uncommon, furbearing species in Missouri and is state-ranked as a **Vulnerable Species of Conservation Concern** by MDC. American badgers are a fossorial (burrowing animal) species and require habitat where suitable soil is available to dig burrows. Additionally, many of the American badger's prey species, such as prairie dogs, ground squirrels, or other small rodents, also are fossorial. American badgers can be found throughout the state in any of the **8 zoological regions** (Figure 24), but soil most suitable for burrowing mammals occurs primarily in four zoological regions: Western Prairie, Northwest Prairie, Northern Riverbreaks, and Northeast Riverbreaks. Consequently, the bulk of the recorded sightings in the Missouri Natural Heritage database occur in these four regions.

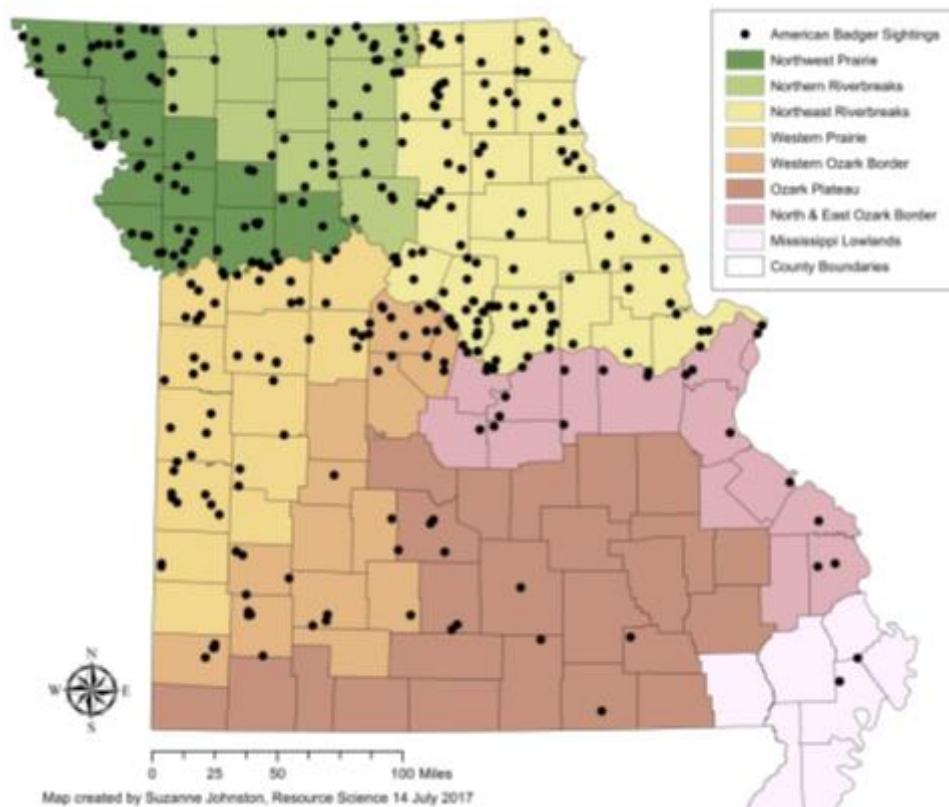


Figure 24. American badger sightings in the Missouri Natural Heritage database range from the 1940s to present and occur in all 8 zoological regions. This includes 234 records added between 2009 and 2011.

Considered a furbearing species in the state of Missouri, American badgers are harvested annually during the trapping season. However, harvest has been historically low compared to other furbearers because American badger pelts are not highly sought after and typically sell for lower prices than other, more valuable pelts (Figure 25). Furthermore, most American badger harvest occurs as a result of removing nuisance animals. In recent decades, harvest has declined and is likely a result of several factors. First, grasslands and prairies, where the soil substrate is suitable for burrowing, are primary habitat types for American badgers. As these habitats are converted to intensive agriculture, available habitat for American badgers decreases, mostly due to the loss of prey species in these areas. Second, interest in trapping also has declined and fewer individuals participate in trapping.

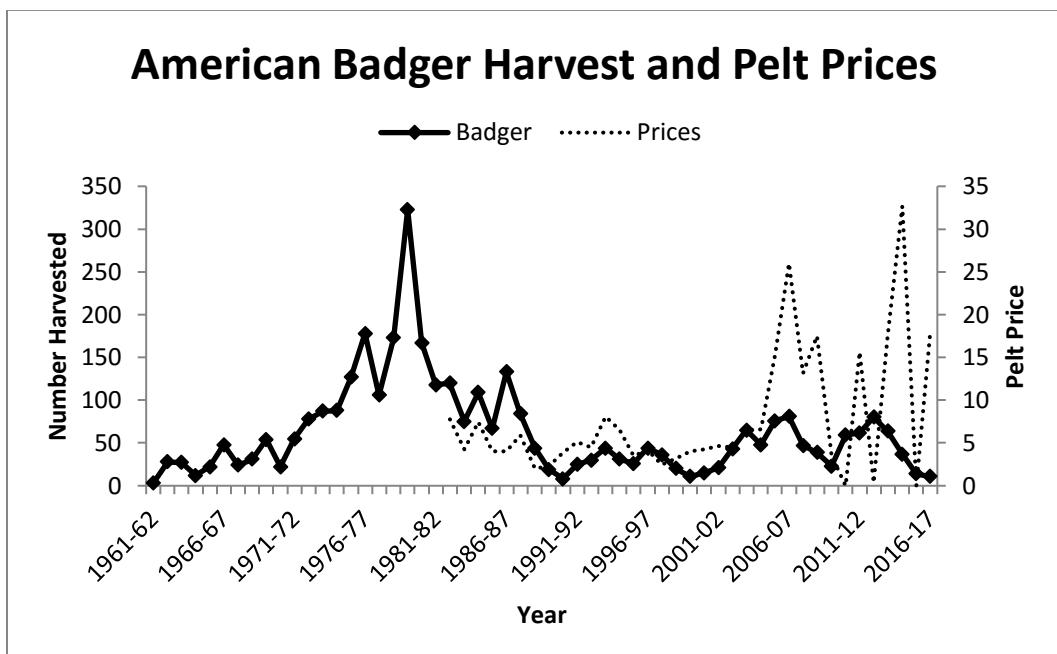


Figure 25. American badger harvest (1961 to present) and pelt prices (1983 to present) in Missouri.

Although sightings have been recorded since the 1940s, a concerted effort to collect and record American badger observations and specimens from citizens (e.g., trappers) and MDC personnel began in 2009 and continued through 2011 to better understand the demographics and distribution of American badgers in Missouri. As a result, more than 300 records occur within the Missouri Natural Heritage database allowing the Department to determine where the species is most prevalent in the state. Since 2011, sightings and specimens have been collected opportunistically and MDC will continue to collect information about American badgers from citizens and MDC personnel. Demographic data was summarized in past annual reports and will be periodically updated in the future. The public is encouraged to submit sightings or carcasses, both road-kill and trapped animals, to the Department in the future.





RARE FURBEARERS OF MISSOURI

Missouri residents are fortunate to reside in a state with abundant natural resources, including wildlife, and exceptional diversity of furbearing species. As a result, opportunities for observing wildlife, hunting, and trapping also are abundant. Three traditional furbearing species, the eastern spotted skunk (subspecies plains spotted skunk), least weasel, and long-tailed weasel, recently (within the last 3 decades) exhibited declines in population trends and harvest. The Missouri Department of Conservation (MDC) decided to close trapping for those species due to this significant decline.



The subspecies of **eastern spotted skunks** native to Missouri is the plains spotted skunk. This species was once abundant, albeit not as abundant as their striped cousins, and harvest of 30,000 or more individuals each year was common in Missouri. Declines in annual harvest began in the late 1940s as total harvest dropped precipitously from a high point of more than 55,000 to less than 10,000 individuals over a period of 7 years. After another 5 years, annual harvest dipped to less than 1,000 individuals until harvest dropped to less than 10 each year and MDC closed the season for spotted skunks in 1991-92 (Figure 26). Currently, the plains spotted skunk is listed as **state Endangered** and state-ranked as a **critically imperiled Species of Conservation Concern** in Missouri. Records of spotted skunk sightings are maintained in the MDC Missouri Natural Heritage database, which tracks locations of all Missouri species of conservation concern (Figure 27).

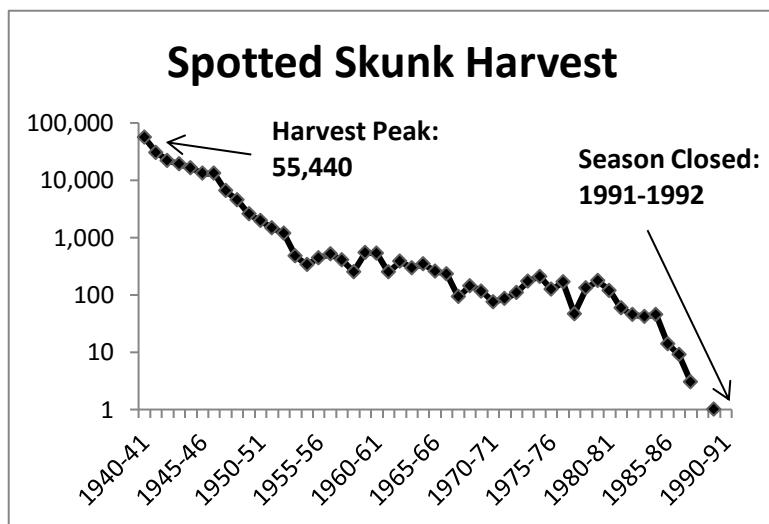


Figure 26. Historic spotted skunk harvest in Missouri from the harvest peak in 1940-41 to the close of the spotted skunk trapping season in 1991-92.

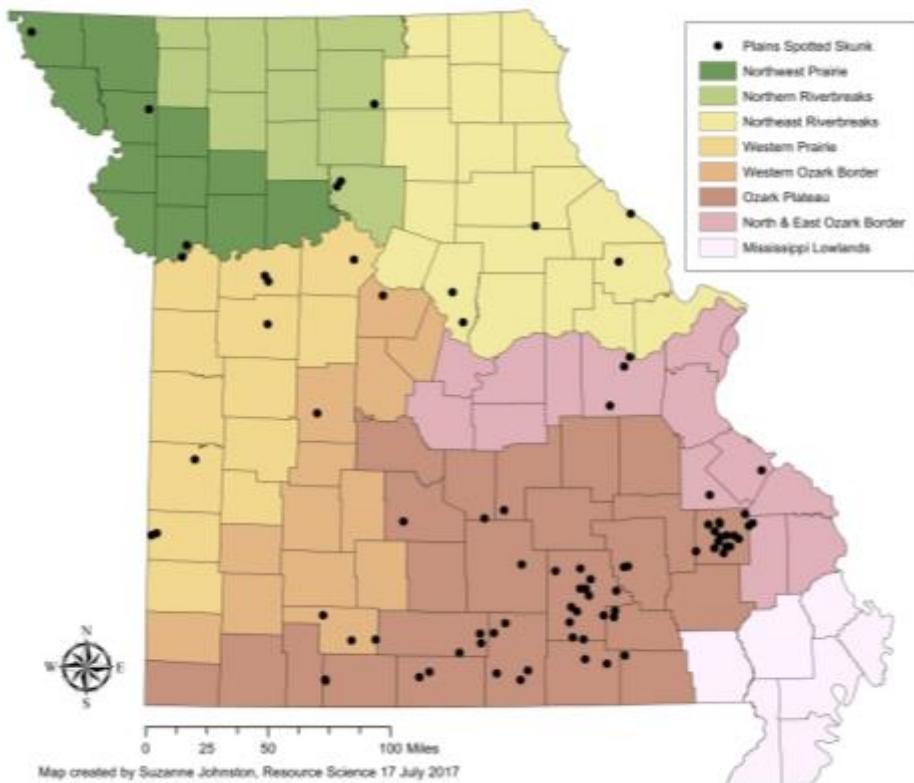


Figure 27. Plains spotted skunk sighting locations in the Missouri Natural Heritage database.

Northern Missouri is the southern extent of the **least weasel's** range, therefore the species was never widespread in the state. Although traditionally considered a furbearer, Missouri's *Wildlife Code* does not define least weasels as a furbearing or game species. Conversely, **long-tailed weasels** can be found from central Canada into portions of South America and thus, can be found throughout the state of Missouri. Long-tailed weasels are the primary target of weasel trapping efforts in Missouri, but harvest records indicate an overall 'weasel' category suggesting take of both species occurred. Weasels were never a large proportion of the fur harvest in Missouri, but harvest peaked in the mid-1930s before steadily declining until the season was closed in 2000-01 (Figure 28). Currently, both weasel species are classified as **Species of Conservation Concern** and state-ranked as **Vulnerable**. Similar to spotted skunks, sightings of both weasel species are maintained in the Missouri Natural Heritage database providing an indication of their distributions in Missouri (Figures 29 and 30).

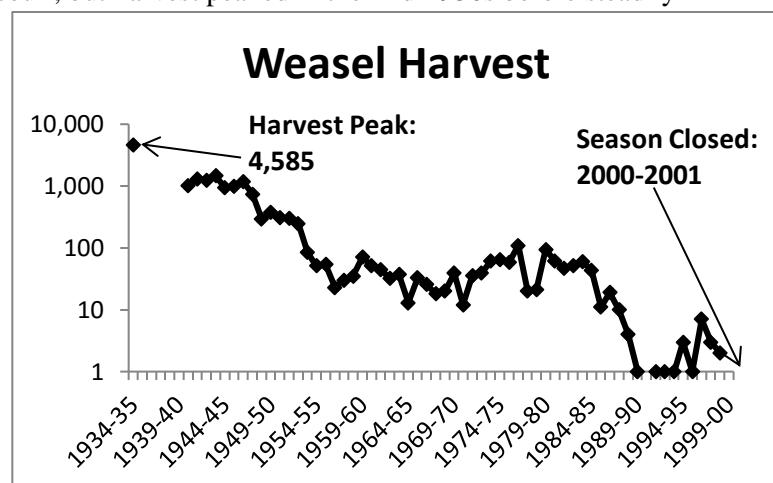


Figure 28. Historic weasel harvest in Missouri from the harvest peak in 1934-35 to the close of the weasel trapping season in 2000-01 with a gap in harvest data from 1935-36 through 1939-40.

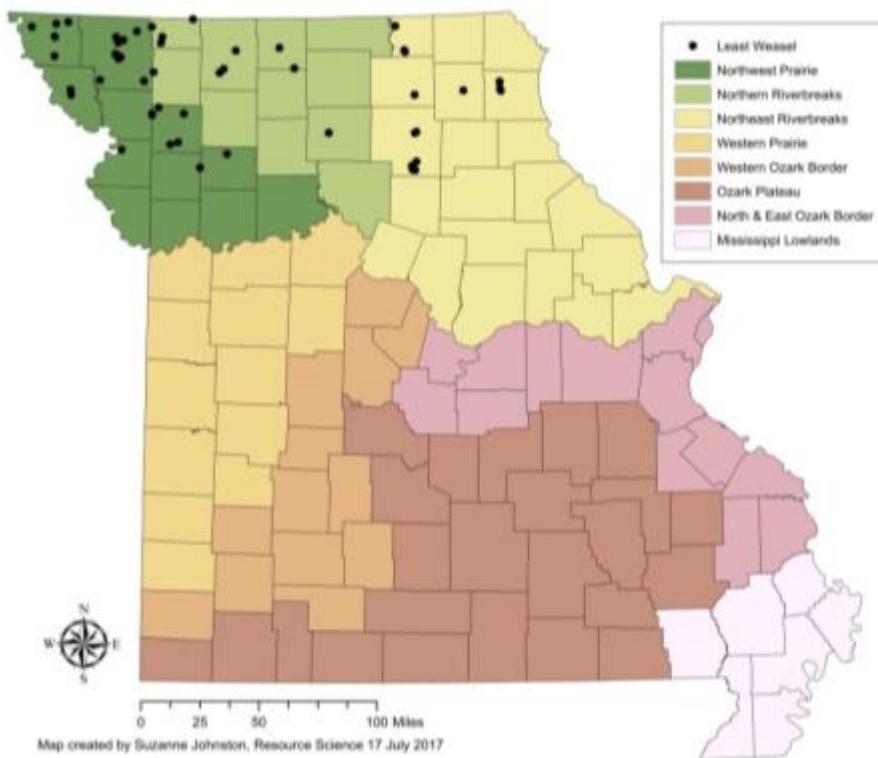


Figure 29. Least weasel sighting locations in the Missouri Natural Heritage database.

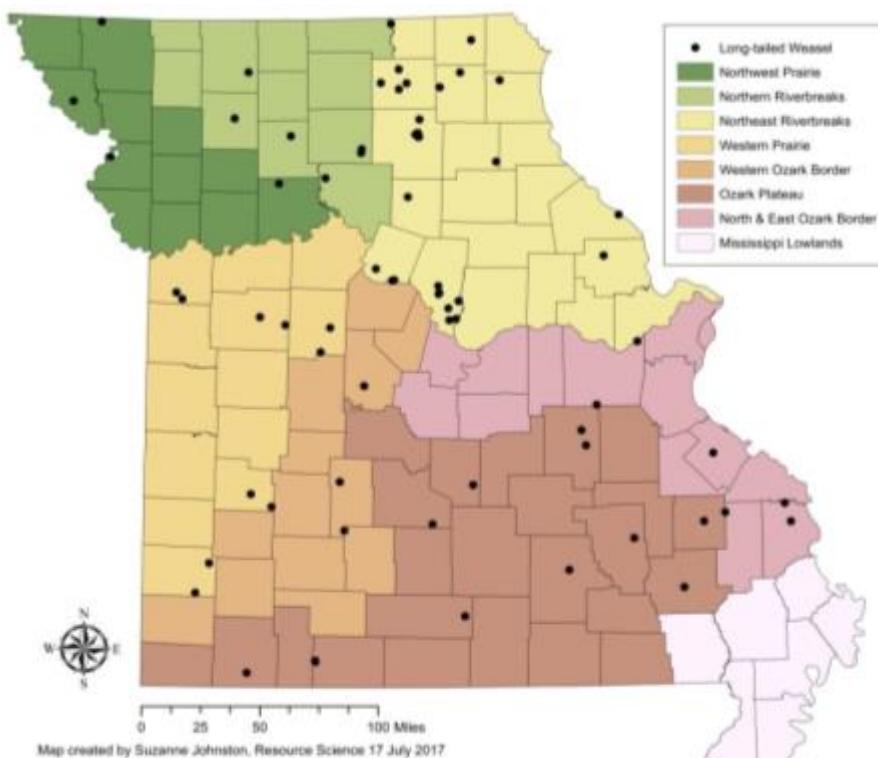


Figure 30. Long-tailed weasel sighting locations in the Missouri Natural Heritage database.



MOUNTAIN LION RESPONSE TEAM ANNUAL UPDATES

The Missouri Department of Conservation developed a Mountain Lion Response Team (MLRT) in 1996 to address the concerns and reports from the public regarding mountain lions and the occasional confirmed occurrence of a mountain lion in the state. The MLRT consists of MDC employees across the state. MLRT members have special qualifications or have received training to address mountain lion concerns and conduct investigations when evidence is present.

All reported mountain lion sightings are categorized and entered into a long-term database. The MLRT also keeps track of confirmed cases of mountain lions in Missouri when there is physical evidence to support a sighting, such as a track, carcass, photo, video, etc. The MLRT has logged over 3,000 reported sightings in the database since 1994. During this time period there have been 69 mountain lion observations confirmed in the state (Figure 31). Mountain lion confirmations continue to increase in the Midwest, and Missouri has confirmed more mountain lion incidents than any other state without a resident population of mountain lions. Mountain lion confirmations in Missouri are primarily the result of game camera photos or videos (72.5%), followed by mountain lion carcasses (11.6%) and DNA confirmations from hair and elk/deer carcasses (8.7%, Figure 32). Genetic analyses indicate origins of South Dakota (n=6), Montana (n=1), Wyoming (n=1), and Colorado (n=1). Prior to 2016, all DNA confirmations were male mountain lions; however, female DNA was detected in Shannon County. In February of 2016, a three year old cow elk, suspected to be affected by brain worm, was killed by a mountain lion. Genetic analyses of samples collected from the elk carcass revealed the mountain lion was a female with a probable population of origin in the Black Hills of Wyoming and South Dakota, and northwest Nebraska. When sex and age can be determined, most mountain lions confirmed in Missouri are dispersing sub-adult males, which is consistent with other Midwestern states. Breeding has not been documented in Missouri.

There have been **5 new mountain lion confirmations** since June 2016. The six-county region of Shannon, Texas, Oregon, Carter, Ripley, and Reynolds counties continues to be a “hot-spot” for confirmations with 2 of the last 5 confirmations falling in this region. Three of the last 5 confirmations were trail camera photos, 1 was a trail camera video, and 1 was a road-killed animal. In the last year, nearly **300 reports were submitted** to the MLRT via the website reporting form and e-mail account associated with the MLRT; however, this is a minimum count because many reports that are sent to local agency staff (e.g., Sheriff’s departments, state police, etc.) are not recorded. For more information on mountain lions in Missouri, or to submit a report, please visit: <https://nature.mdc.mo.gov/discover-nature/report-wildlife-sightings/mountain-lion-reports>

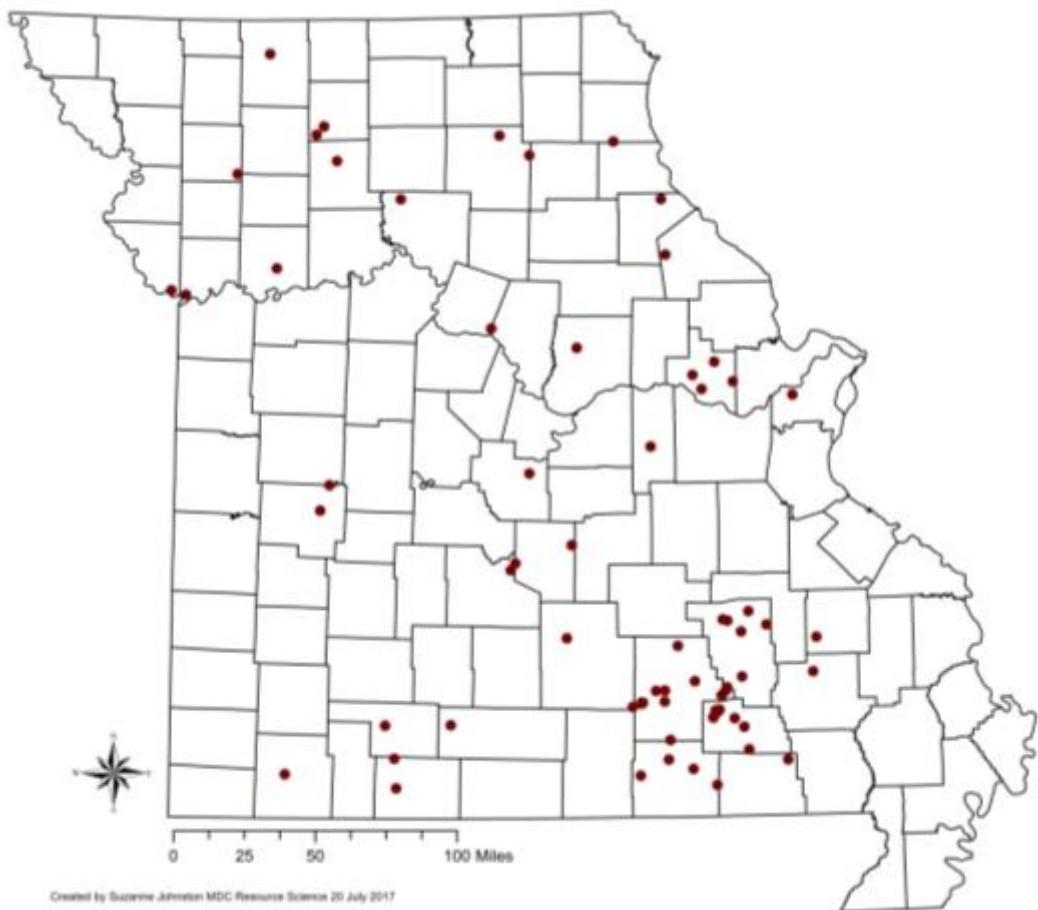


Figure 31. Geographic distribution of the 69 mountain lion confirmations in Missouri from 1994 to July 2017.

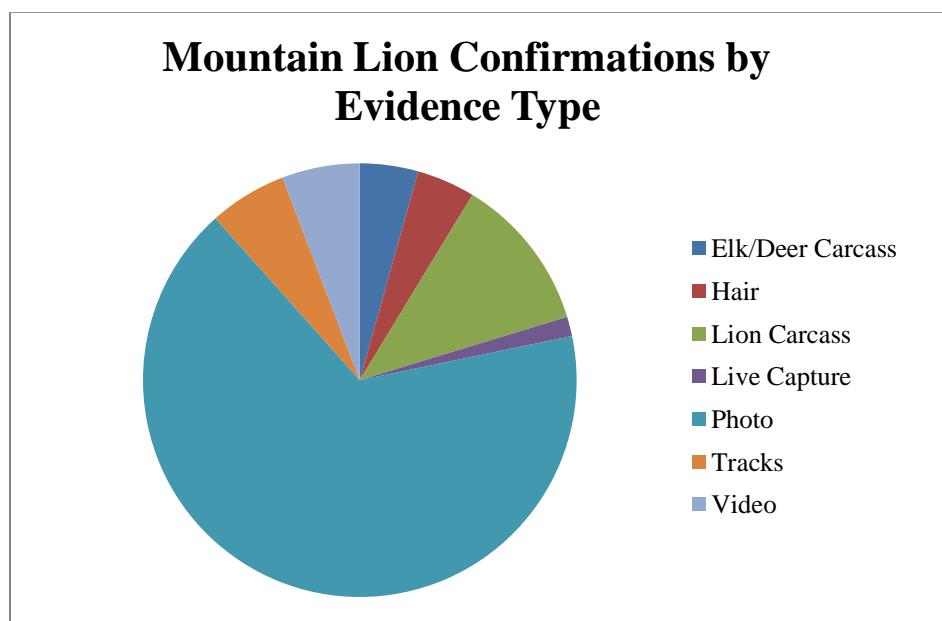


Figure 32. The proportion of mountain lion confirmations made by each type of evidence.



STATE FURBEARER RECORDS

Official furbearer weight records began being kept in 2011. Candidate furbearers must be brought to one of the statewide fur auctions or to the Central Regional Office in Columbia for weighing on a certified scale. **Three new** record-sized furbearers were harvested in the 2016-2017 hunting and trapping seasons (Table 5). Please note that some larger weights may have occurred prior to official record keeping in 2011, but cannot be considered record weights at present.

Table 5. Current record-holders of exceptionally sized furbearing species.

Current Record Furbearers						
Species	Sex	Date Taken	County Taken	Weight (lbs.)	Ounces (oz.)	Hunter/Trapper
Badger	M	17 Dec 2014	Perry	28	14.4	Corey Robinson
Beaver	M	17 Dec 2014	Marion	73	0	Jeff Dornberger & Blaine Pope
Bobcat	F	18 Jan 2014	Macon	36	0	Shane Viers
Coyote	M	2 Dec 2015	Vernon	48	0	Tyler Shouse
Gray Fox	M	2 Jan 2016	Marion	12	11	Lance Hudson & Bobby Gruenloh
Mink	M	19 Jan 2013	Ralls	5	3.2	Jeff Thompson
NEW Muskrat	M	27 Nov 2016	Marion	4	0	Blaine & Teagan Pope
Nutria	M	2 Feb 2014	Pemiscot	15	12.8	Charlie Brown
NEW Opossum	M	18 Dec 2016	Lincoln	16	2.6	Jacob Doll
Raccoon	M	4 Dec 2015	Gentry	28	8	Dennis Nelson
Red Fox	M	18 Dec 2015	St. Francois	13	0.4	Justin Skiles
NEW River Otter	M	29 Dec 2016	Taney	32	5.6	Mark Visnosky
Striped Skunk	U	4 Dec 2015	Marion	7	0	Blaine & Teagan Pope





CABLE RESTRAINTS IN MISSOURI

In 2004, a cooperative agreement between the Missouri Trappers Association (MTA) and the Missouri Department of Conservation (MDC) was established to provide Missouri resident trappers with training to safely and efficiently use **cable restraints** on land for appropriate furbearers. When used properly, cable restraints hold captured coyotes and foxes without mortalities and with minimal injuries. As with trapping in general, the use of cable restraints is a highly regulated activity in Missouri. Anyone who wishes to trap must hold a valid trapping permit and follow strict rules established and enforced by the Missouri Department of Conservation. Trappers may use cable restraints after completing a **certified Cable Restraint Training course** offered at several locations across the state. Check the MDC website or *Wildlife Code*, for full regulations on the use of cable restraints in Missouri. To date, there have been **6,408 trappers certified** to use cable restraints since 2004 (Figure 33) and in 2016, a total of 232 trappers went through the certification process to legally employ cable restraints as a trapping method. Most Missouri resident trappers have been certified since the training course was initiated and there is no longer a requirement to take the course to operate cable restraints; therefore, **2017 will be the last year courses will be required.**

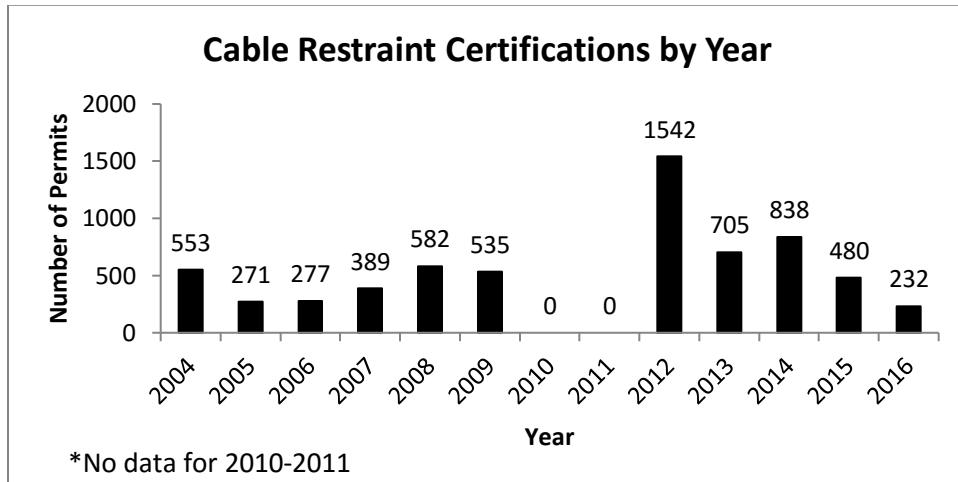


Figure 33. Number of Missouri resident trappers certified to use cable restraints by year.

SECTION II: Project Updates and Summaries



FURBEARER SIGN STATION SURVEY

Beginning in 1977, annual **sign station surveys** for furbearers have been conducted each September and October. The purpose of the survey is to collect population trend information for Missouri's furbearing species. Twenty-five routes are distributed throughout the state in 25 different counties. Routes consist of five segments with 10 sign stations per segment for a total of 50 stations per route. Each sign station is a 36-inch diameter circle of sifted soil, spaced 0.3 miles along gravel road shoulders. A fatty acid scent disc is placed in the center of each station as an attractant. Each station is operated for one night and evaluated the following day for visitation.

Each station is described as operable or inoperable by the observer, stations with tire tracks or those destroyed by a road grader were deemed inoperable. All operable stations were included in calculations of indices, regardless of track presence, but inoperable stations were not used for calculations. Tracks were identified within the 36-inch circle of the station. Occupancy of a station by a species was recorded, but not the number of individuals per species.

Seventeen of 25 routes (Figure 34) were completed in 2016 with a total of **797 operable stations** out of a possible 850. A summary of operable stations for each zoological region is presented in Table 6. Tire tracks were the only cause of inoperable stations. The most common furbearers to visit stations were raccoon, opossum, and coyote (Figure 35). The least common were weasel, gray and red fox. Non-mammalian visitors were primarily birds, such as turkeys.

Species specific population index trends from 1977 to 2016 based on the Furbearer Sign Station Survey are displayed in Figures 36 through 39. Most furbearers have an overall increasing trend with the exception of red and gray fox populations, which have been in an overall decline since the initiation of the Sign Station Survey. These trends are also reflected in the Archer's Index and harvest records.

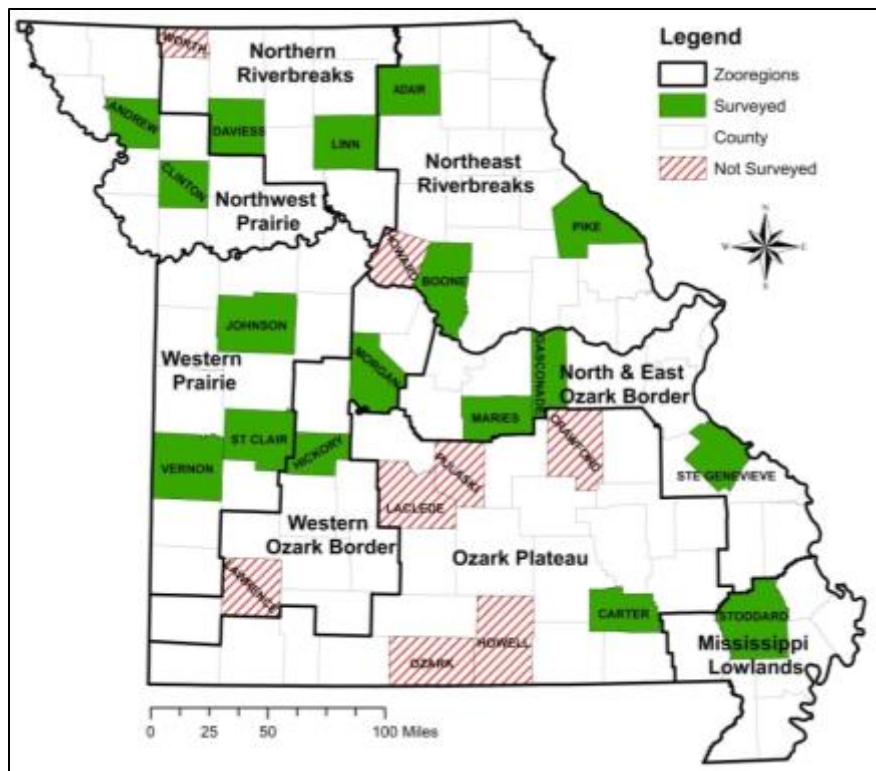


Figure 34. Map of Missouri's 8 zoological regions and counties where sign station surveys were completed (green) and counties where surveys were not completed (red hash) in 2016.

Table 6. Summary of operable and inoperable sign stations in 2016 by zoological regions of Missouri.

Zooregion	Routes Completed	Operable Stations	Inoperable Stations
Northwest Prairie	2	91	9
Northern Riverbanks	2	97	3
Northeast Riverbanks	3	133	17
Western Prairie	3	141	9
Western Ozark Border	2	98	2
Ozark Plateau	1	48	2
North & East Ozark Border	3	140	10
Mississippi Lowlands	1	49	1
TOTAL	17	797	53

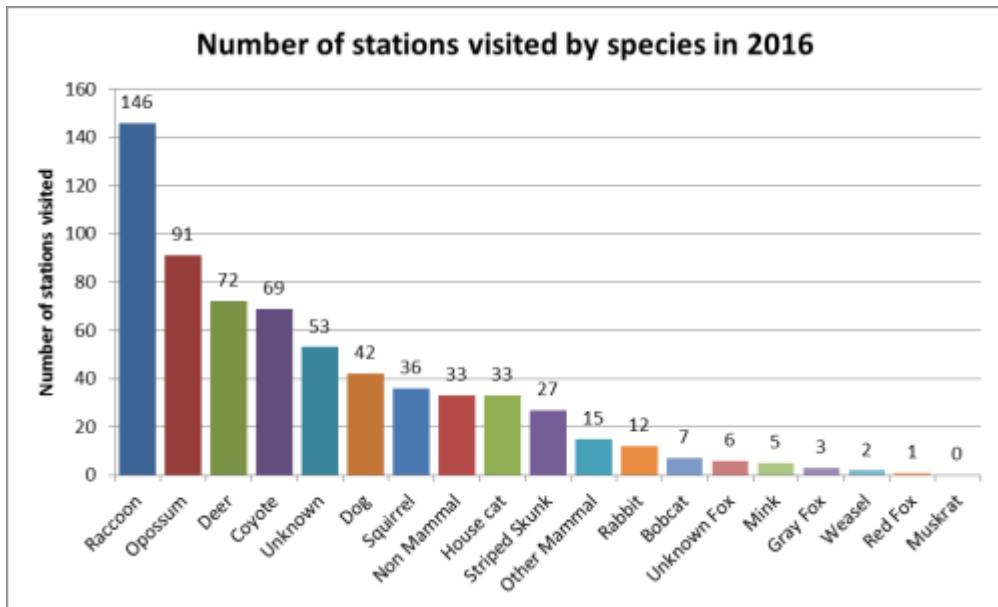


Figure 35. The number of stations visited by each mammal species, including non-furbearer species, out of 797 operable stations in the 2016 Missouri Furbearer Sign Station Survey.

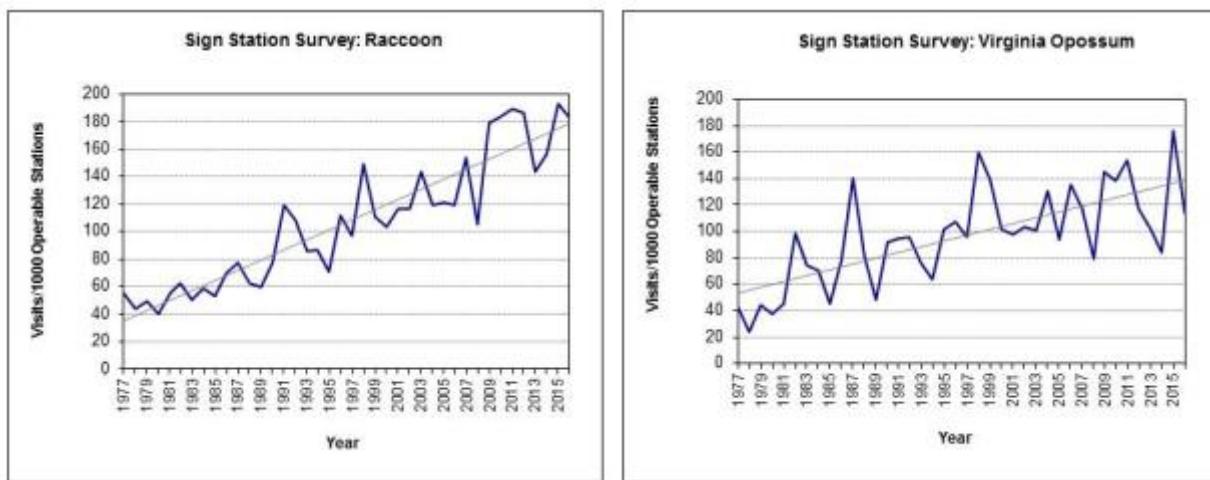


Figure 36. Raccoon and Virginia opossum population index trends from 1977 to 2016 in Missouri.

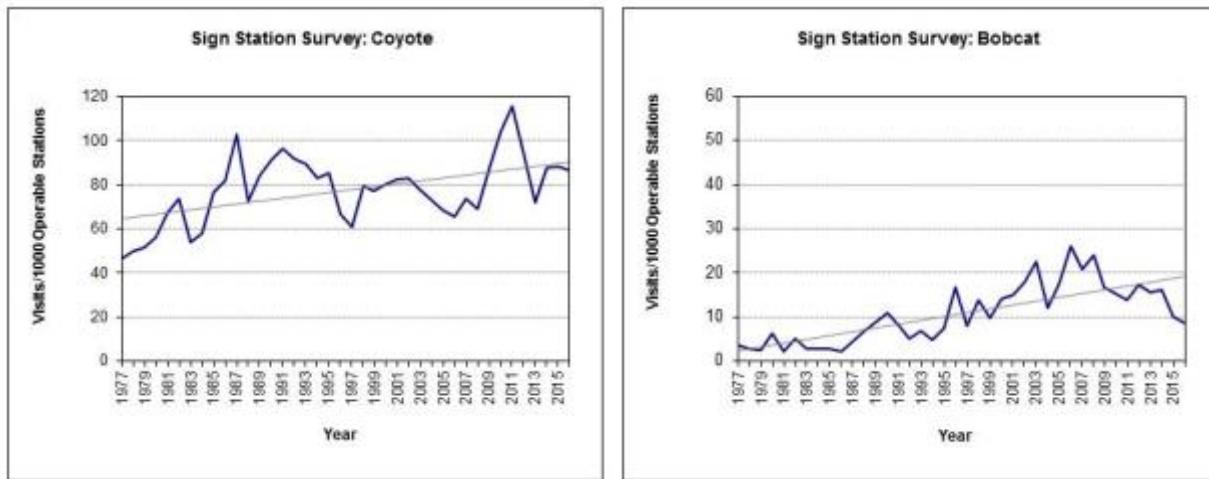


Figure 37. Coyote and bobcat population index trends from 1977 to 2016 in Missouri.

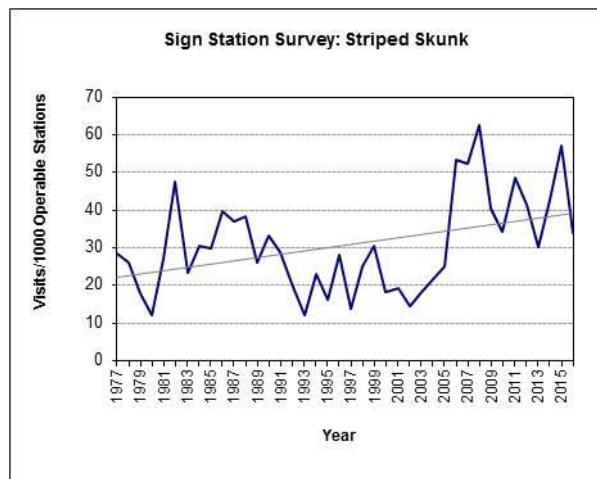


Figure 38. Striped skunk population index trend from 1977 to 2016 in Missouri.

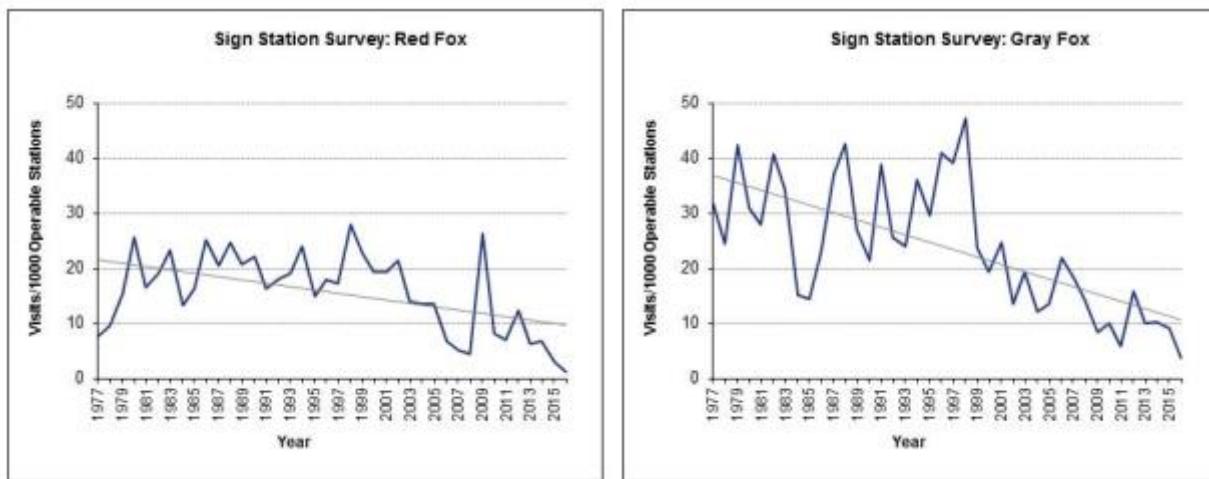


Figure 39. Red and gray fox population index trends from 1977 to 2016 in Missouri.



ARCHER'S INDEX OF FURBEARER POPULATIONS

Missouri Department of Conservation has conducted annual surveys of wildlife populations via the Bowhunter Observation Survey for 34 consecutive years (1983-2016). Each fall, several thousand archery deer and turkey hunters keep daily observation records of furbearers, other small game animals, deer, and turkeys. Archers volunteer through post-season surveys, articles in the *Missouri Conservationist* magazine, and during sign-ups at bowhunter club meetings and other outdoor events. Archery hunters are asked to record the number of hours hunted, during both morning and evening hunts, and to use a standardized daily diary to record hours and sightings of wildlife. MDC uses the number of sightings of each species divided by the total number of hours hunted statewide to calculate a sighting index which is expressed as sightings per 1,000 hunter hours, called the Archer's Index.

Wildlife population indices calculated from archer's diaries are useful trend indicators for terrestrial wildlife species, such as coyotes, raccoons, foxes, and bobcats. Hunters are well distributed statewide with volunteers in 113 of the 114 counties during most years. Bowhunters averaged 53,285 hours per year in the stand over the last 34 years, and ranged from 30,990 hours in 1985 to 84,497 hours in 1988 (Table 7). In 2016, hunters spent **41,409 total hours** in the stand, which is down from 58,203 hours in 2015.

Line graph representations of Archer's Indices for several furbearer species are shown in Figures 40 through 45. Based on these indices, long term raccoon, bobcat and opossum observations suggest population increases. Striped skunk and coyote populations are relatively steady, while observations suggest a downward trend for red and gray fox populations. Wildlife population indices are also depicted by county (Table 8).

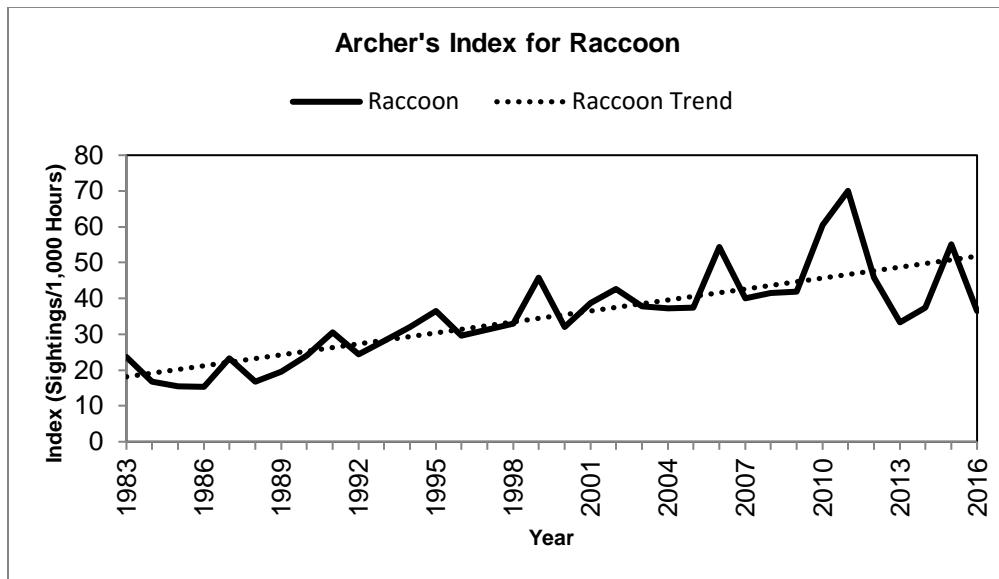


Figure 40. Raccoon population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey

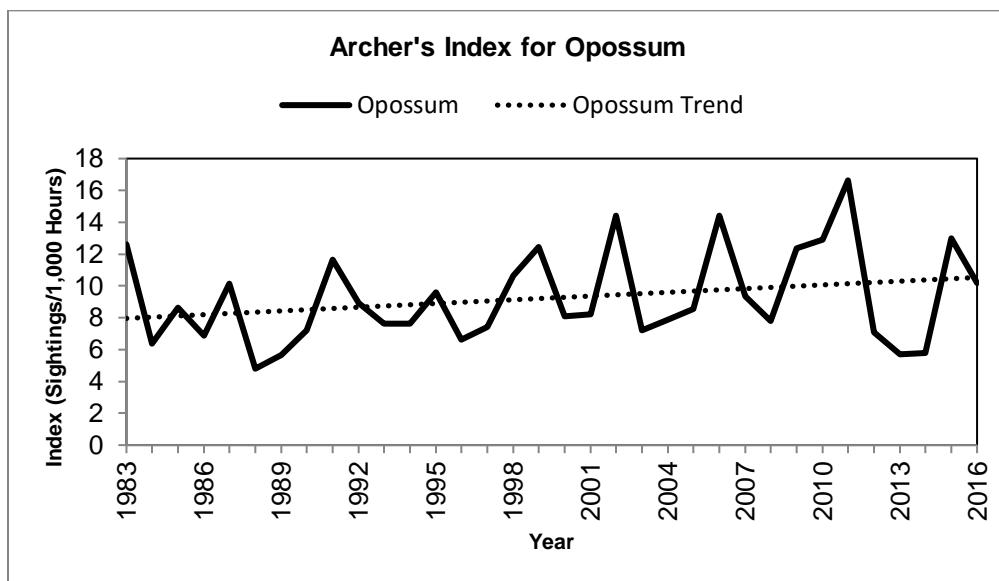


Figure 41. Virginia opossum population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

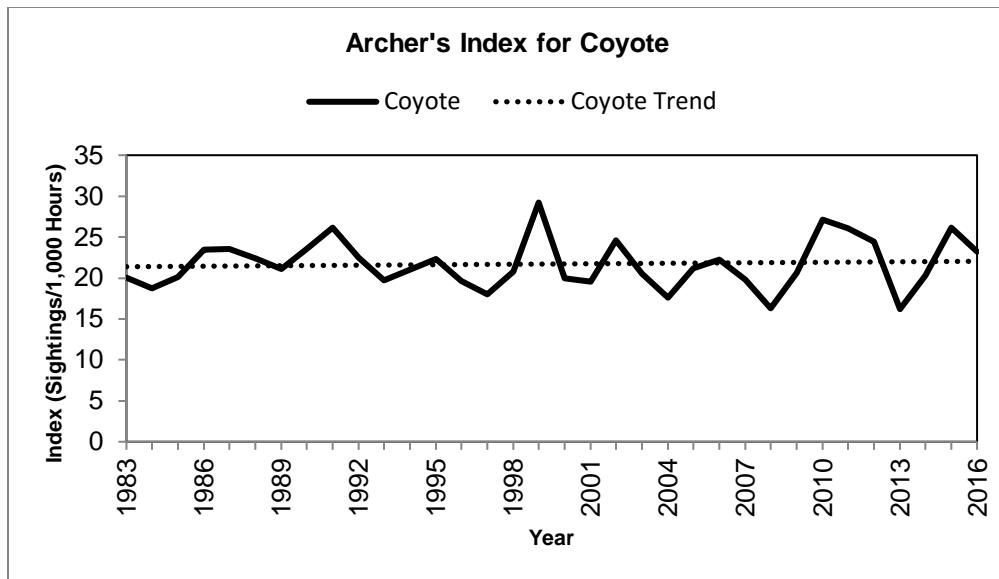


Figure 42. Coyote population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

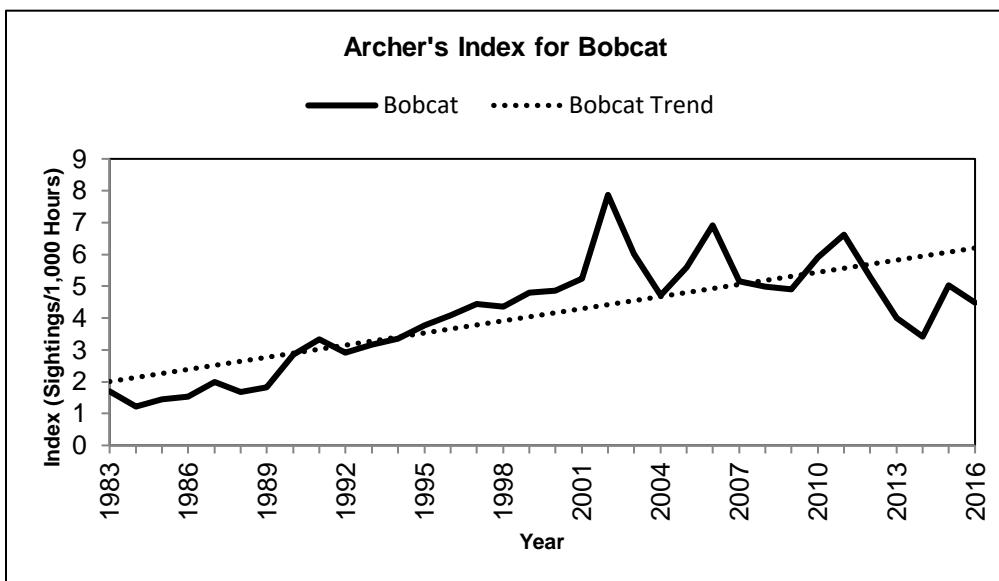


Figure 43. Bobcat population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

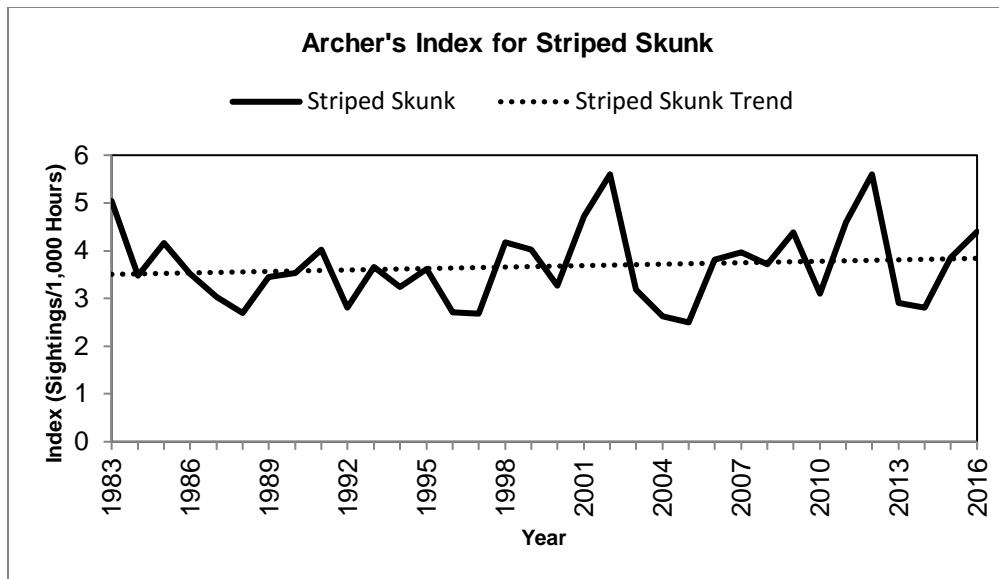


Figure 44. Striped skunk population trends in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

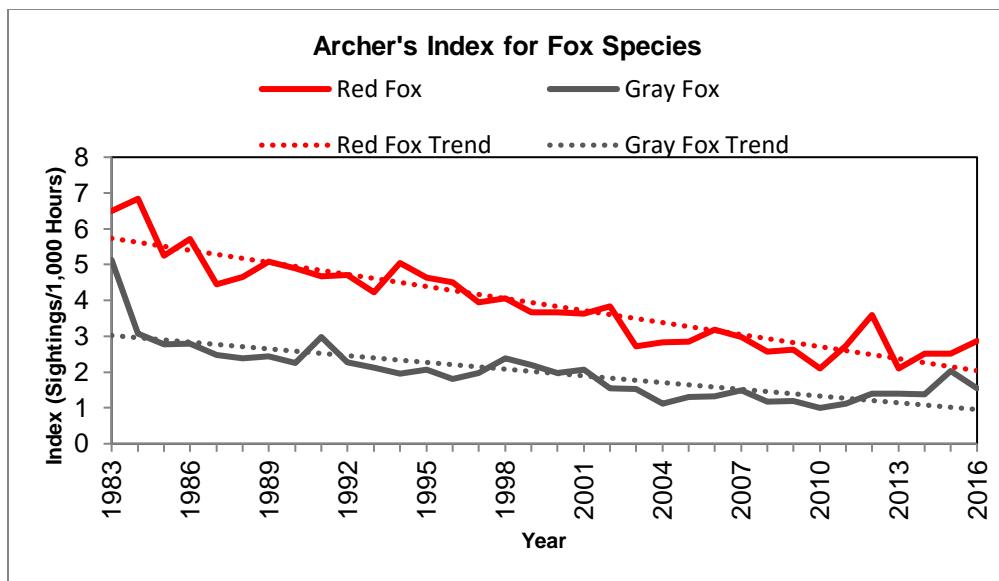


Figure 45. Red fox and gray fox population trends in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

Table 7. Missouri hunter hours and furbearer population indices based on archer's diaries, 1983 to 2016.

YEAR	Hunter Hours	Coyote	Red Fox	Gray Fox	Bobcat	Raccoon	Virginia Opossum	Striped Skunk	Mink	Beaver	Muskrat	Weasel	Badger	River Otter	Black Bear
1983	55,374	20.0	6.5	5.1	1.7	23.8	12.6	5.0	0.7	0.3	0.5	0.1	0.1	0.0	0.0
1984	32,746	18.8	6.8	3.1	1.2	16.9	6.4	3.5	0.3	0.3	0.1	0.0	0.1	0.0	0.0
1985	30,990	20.1	5.3	2.8	1.5	15.4	8.6	4.2	0.5	0.4	0.4	0.1	0.1	0.1	0.0
1986	51,727	23.5	5.7	2.8	1.5	15.3	6.9	3.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0
1987	57,457	23.5	4.5	2.5	2.0	23.3	10.1	3.0	0.3	0.7	0.2	0.1	0.1	0.1	0.0
1988	84,497	22.4	4.7	2.4	1.7	16.7	4.8	2.7	0.3	0.6	0.1	0.0	0.1	0.1	0.0
1989	72,992	21.1	5.1	2.4	1.8	19.6	5.6	3.5	0.1	0.6	0.1	0.0	0.2	0.1	0.0
1990	72,227	23.6	4.9	2.3	2.9	24.0	7.2	3.5	0.2	0.4	0.1	0.0	0.1	0.1	0.0
1991	64,434	26.1	4.7	3.0	3.3	30.5	11.7	4.0	0.3	0.3	0.1	0.0	0.1	0.0	0.1
1992	64,452	22.5	4.7	2.3	2.9	24.3	8.9	2.8	0.6	0.7	0.1	0.0	0.1	0.3	0.0
1993	53,857	19.7	4.2	2.1	3.2	28.1	7.7	3.7	0.2	0.5	0.2	0.0	0.1	0.3	0.0
1994	49,102	21.0	5.1	2.0	3.4	32.0	7.6	3.2	0.1	0.5	0.2	0.0	0.2	0.2	0.0
1995	66,106	22.3	4.6	2.1	3.8	36.5	9.6	3.6	0.1	0.3	0.1	0.0	0.1	0.3	0.1
1996	60,077	19.6	4.5	1.8	4.1	29.7	6.6	2.7	0.0	0.3	0.0	0.0	0.1	0.5	0.0
1997	47,816	18.0	4.0	2.0	4.5	31.2	7.4	2.7	0.1	0.4	0.0	0.0	0.1	0.6	0.0
1998	43,152	20.8	4.1	2.4	4.4	33.0	10.6	4.2	0.1	0.3	0.1	0.0	0.2	0.3	0.1
1999	44,012	29.2	3.7	2.2	4.8	45.9	12.5	4.0	0.2	0.3	0.1	-	0.1	0.5	-
2000	50,795	20.0	3.7	2.0	4.9	32.1	8.1	3.3	0.0	0.2	0.0	0.0	0.1	0.3	0.0
2001	47,023	19.5	3.6	2.1	5.2	38.7	8.2	4.7	0.1	0.4	0.0	0.0	0.1	0.3	0.0
2002	42,826	24.6	3.8	1.5	7.9	42.6	14.4	5.6	0.3	0.1	0.0	0.0	0.1	0.8	0.1
2003	39,964	20.5	2.7	1.5	6.0	37.9	7.2	3.2	0.1	0.1	0.0	0.0	0.2	0.6	0.0
2004	35,071	17.6	2.8	1.1	4.7	37.3	7.9	2.6	0.1	0.1	0.1	0.0	0.1	1.2	0.0
2005	68,440	21.2	2.8	1.3	5.6	37.3	8.5	2.5	0.1	0.3	0.0	0.0	0.1	0.5	0.0
2006	60,040	22.2	3.2	1.3	6.9	54.4	14.4	3.8	0.3	0.2	0.0	0.0	0.1	0.5	0.0
2007	50,390	19.8	3.0	1.5	5.2	40.0	9.4	4.0	0.0	0.1	0.0	0.0	0.1	0.4	0.0
2008	44,471	16.3	2.6	1.2	5.0	41.5	7.8	3.7	0.1	0.1	0.1	0.0	0.4	0.3	0.0
2009	44,919	20.6	2.6	1.2	4.9	42.0	12.4	4.4	0.1	0.1	0.1	0.0	0.2	1.2	0.1
2010	42,907	27.1	2.1	1.0	5.9	60.6	12.9	3.1	0.2	0.1	0.0	0.0	0.2	0.7	0.0
2011	41,370	26.1	2.7	1.1	6.6	70.1	16.6	4.6	0.2	0.1	0.1	0.0	0.2	0.9	0.0
2012	63,621	24.4	3.6	1.4	5.3	45.8	7.1	5.6	0.1	0.1	0.0	0.0	0.3	1.1	0.0
2013	68,674	16.2	2.1	1.4	4.0	33.3	5.7	2.9	0.1	0.2	0.1	0.0	0.1	0.6	0.1

YEAR	Hunter Hours	Coyote	Red Fox	Gray Fox	Bobcat	Raccoon	Virginia Opossum	Striped Skunk	Mink	Beaver	Muskrat	Weasel	Badger	River Otter	Black Bear
2014	60,560	20.3	2.5	1.3	3.4	37.5	5.8	2.8	0.0	0.1	0.0	0.0	0.3	0.3	0.1
2015	58,203	26.2	2.5	2.0	5.0	55.2	13.4	3.8	0.0	0.0	0.1	0.0	0.3	0.6	0.1
2016	41,409	23.3	2.9	1.5	4.5	36.6	10.2	4.4	0.0	0.3	0.1	-	0.2	0.2	0.2

Table 8. Missouri furbearer species population indices (sightings/1,000 hours) by county derived from the MDC Bowhunter Observation Survey in 2016.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Adair	12	91	20	.	.	7	.	.
Andrew	18	30	7	4	.	.	.	.
Atchison	.	36	27	.	.	.	.	.
Audrain	38	57	15	4	.	.	.	.
Barry	22	11	4	2	20	7	.	.
Barton	38	151	52	.	.	9	.	.
Bates	79	65	22	.	4	11	.	.
Benton	12	7	7	.	1	9	.	.
Bollinger	8	13	3	10	.	13	.	.
Boone	9	35	14	9	17	3	.	.
Buchanan	38	131	14	5	.	5	.	.
Butler	19	13	3	.	.	.	3	.
Caldwell	16	33	22	.	.	27	.	.
Callaway	9	17	4	4	9	1	.	.
Camden	17	17	10	.	.	7	.	.
Cape Girardeau	17	21	18	.	.	1	.	.
Carroll	38	32	32	.	.	.	6	.
Carter	3	14	3	.	.	.	.	.
Cass	48	51	19	3	.	5	.	.
Cedar	26	37	18	.	.	.	.	.
Chariton	21	73	.	.	.	.	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Christian	7	35	21	.	.	.	.	.
Clark	29	44	22	4	4	7	.	.
Clay	48	54	6	10	.	10	.	.
Clinton	61	.	.	.	.	10	.	.
Cole	15	60	.	8	.	.	.	.
Cooper	28	38	19	.	.	.	.	.
Crawford	14	7	14	.	.	4	.	.
Dade	6	44	44	.	.	19	.	.
Dallas	25	68	25	4	.	14	.	.
Daviess	18	62	4	4	.	.	.	.
Dekalb	203	57	61	.	.	5	.	.
Dent	11	5	2	.	.	5	.	.
Douglas	25	15	10	.	.	15	.	10
Dunklin	.	30	30	.	.	.	.	.
Franklin	10	15	2	2	1	3	.	.
Gasconade	44	20	5	.	.	5	.	.
Gentry	70	49	12	.	.	8	.	.
Greene	35	28	.	3	.	7	.	.
Grundy	.	.	.	.	.	.	.	.
Harrison	65	95	10	.	.	.	3	.
Henry	.	31	10	.	.	26	.	.
Hickory	.	17	.	.	.	3	.	.
Holt	41	51	20	.	.	.	.	.
Howard	23	55	6	.	.	.	.	.
Howell	35	44	4	9	.	4	.	.
Iron	22	37	7	.	.	.	.	.
Jackson	68	81	50	52	.	.	.	.
Jasper	33	44	11	.	.	11	.	.
Jefferson	9	41	1	9	.	1	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Johnson	33	84	24	.	3	.	.	.
Knox	21	96	14	8	.	12	.	.
Laclede	32	34	24	8	2	8	.	.
Lafayette	43	35	23	8	16	4	.	.
Lawrence	59	43	5	.	.	.	.	.
Lewis	13	53	3	3	.	3	.	.
Lincoln	10	20	7	2	5	5	.	.
Linn	13	28	0	13	0	2	0	0
Livingston	7	29	4	2	.	2	.	.
McDonald	21	.	7	.	.	10	.	.
Macon	27	31	4	.	12	1	1	.
Madison	14	23	36	.	.	9	.	.
Maries	63	.	8	.	.	.	.	.
Marion	9	21	10	.	3	.	.	.
Mercer	24	26	30	4	.	6	.	.
Miller	5	49	.	.	5	10	.	.
Mississippi	63	47	110	.	.	.	.	.
Moniteau	26	26	26	.	.	26	.	.
Monroe	29	46	8	5	4	8	.	.
Montgomery	11	17	13	2	.	11	.	.
Morgan	11	27	6	2	.	8	.	.
New Madrid	.	.	.	.	.	.	.	.
Newton	12	47	10	.	.	2	.	.
Nodaway	94	191	15	.	.	.	.	.
Oregon	22	22	5	.	.	2	.	.
Osage	12	14	2	.	5	5	.	.
Ozark	34	7	.	.	1	3	.	1
Pemiscot	.	.	.	.	.	.	.	.
Perry	66	37	6	.	.	.	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Pettis	43	43	12	.	6	.	.	.
Phelps	9	11	2	.	.	9	.	.
Pike	21	87	17	11	.	.	6	.
Platte	27	37	17	.	.	3	.	.
Polk	17	62	23	.	.	.	.	.
Pulaski	6	19	.	.	.	6	.	.
Putnam	24	32	19	.	8	14	.	.
Ralls	.	22	19	.	.	.	.	.
Randolph	23	47	.	12	.	8	.	.
Ray	.	44	15	.	.	.	.	.
Reynolds	16	.	.	.	.	16	.	.
Ripley	9	20	6	.	.	3	.	.
St. Charles	11	24	4	4	.	4	.	.
St. Clair	19	.	6	.	.	.	.	.
St. Francois	14	14	3	7	.	.	3	.
Ste. Genevieve	7	29	3	3	.	3	.	.
St. Louis	18	20	8	.	.	.	.	.
Saline	45	84	22	2	.	.	.	.
Schuylerville	13	64	6	.	.	.	.	.
Scotland	8	52	11	10	.	.	5	.
Scott	.	106	.	.	.	.	.	.
Shannon	.	.	.	.	.	8	.	.
Shelby	9	41	6	2	.	2	.	.
Stoddard	23	23	.	.	.	5	.	.
Stone	170	.	.	.	.	.	.	.
Sullivan	52	22	13	.	.	.	.	.
Taney	17	.	.	.	.	3	.	.
Texas	5	52	2	5	.	2	.	.
Vernon	25	19	8	.	6	2	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Warren	21	17	3	.	.	5	.	.
Washington	14	5	.	.	.	9	.	.
Wayne	21	92	9	.	4	9	.	4
Webster	31	36	4	.	.	.	.	.
Worth	22	81	16	.	.	12	.	.
Wright	6	11	6	.	.	6	.	.
Statewide Index	23.3	36.6	10.2	2.9	1.5	4.5	0.2	0.2



MONITORING AND DEMOGRAPHIC ASSESSMENT OF RIVER OTTERS AND BOBCATS IN MISSOURI

River otter and bobcat are commonly sought after furbearers in Missouri and there are no harvest level restrictions on river otters or bobcats. Various population indices suggest these species are not in danger of being over harvested; however, harvest of these species has been challenged in a number of states. MDC began a research project to document the sex and age of harvested animals and measure harvest effort by trappers for these species. These and other data will enable MDC to utilize Statistical Population Reconstruction (SPR) to generate abundance estimates and measure the impact of harvest and regulations on river otter and bobcat populations. Through SPR, the MDC will have a better understanding of the relationship between harvest rates and demographics of each species. Population reconstruction will also provide the MDC with solid harvest and population data.

In order to utilize SPR, MDC collects information on harvested river otter and bobcat through mandatory registration and voluntary tooth submission. Trappers are asked to remove one of the lower canine teeth from each river otter and bobcat they harvest so that age-at-harvest can be determined. Sex, date of harvest, method, and effort (trapped animals) are collected when river otter or bobcat are tagged or registered with the Department.

During the 2015-16 river otter and bobcat harvest seasons, 437 lower canine teeth were collected from both river otters and bobcats with 24 samples excluded from analysis because they were cut too short or the wrong tooth was sent in for aging. The samples sent for aging consisted of 241 river otter (Figure 46) and 172 bobcat teeth (Figure 47). Age data for the 2016-17 season are not yet complete.



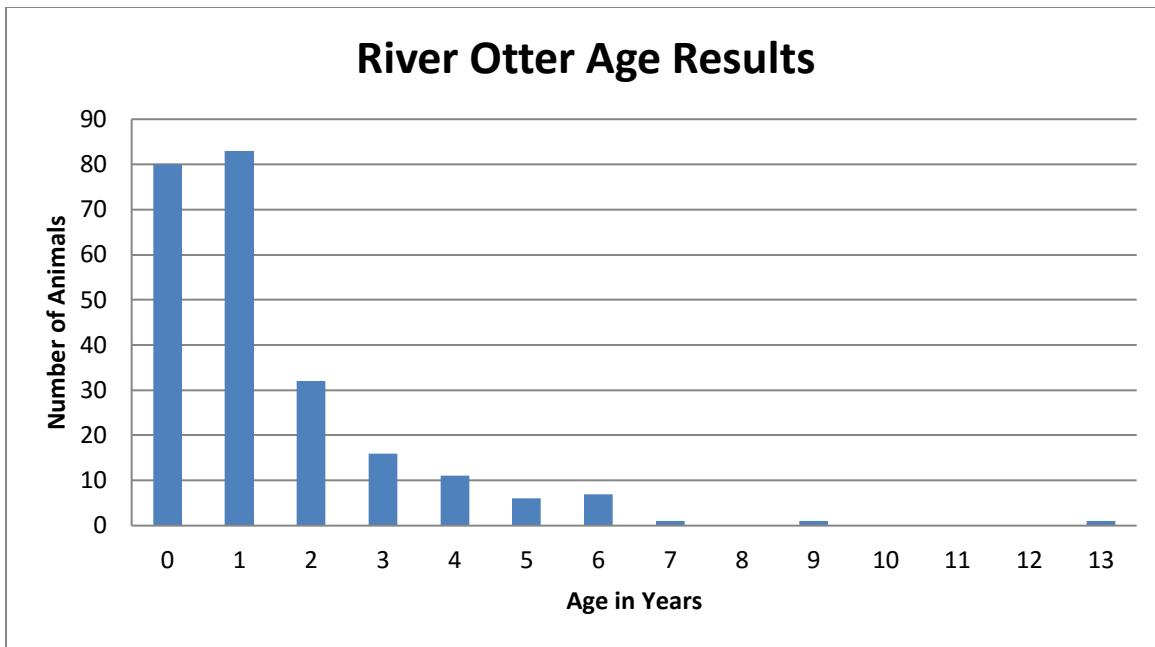


Figure 46. Complete age results from the Missouri 2015-16 river otter harvest season.

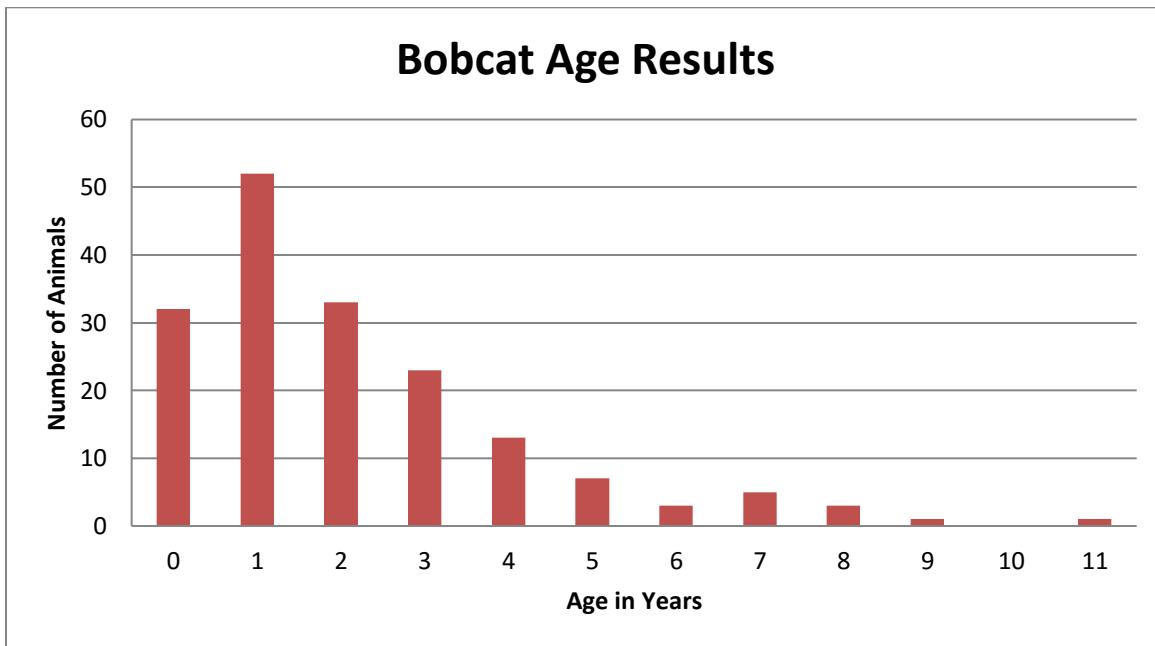


Figure 47. Complete age results from the Missouri 2015-16 bobcat harvest season.



BLACK BEAR DISTRIBUTION AND STATUS

Black bear goal/vision statement:

The current goal of black bear management in Missouri is to encourage black bear population expansion within their natural range in Missouri, and to manage black bears consistent with the available habitat and within the limits of human tolerance.

Black bear program objectives:

- Increase knowledge about current black bear population status in Missouri.
- Increase knowledge of black bear ecology in Missouri, how they move, disperse and travel on a landscape level and identify source and sink populations.
- Develop black bear conservation and management strategies based on information gathered through research, monitoring, and surveys.
- Educate Missouri's public, the media, and other resource professionals in Missouri and the Midwest about black bears and Missouri's black bear management program.

The Black Bear Management Plan was drafted and approved in 2008 by a multi-agency group of resource professionals from the Missouri Department of Conservation, U.S. Forest Service, National Park Service, and Missouri Department of Natural Resources. The entire black bear management plan can be viewed at:

https://nature.mdc.mo.gov/sites/default/files/downloads/black_bear_plan_2008_01-31-11.pdf

Citizen reports of black bear sightings are important for delineating bear range expansion in the state. Reports of bears with cubs help to define the breeding range of bears in Missouri. Bear sightings are reported to local Conservation staff and through an electronic reporting system available on the MDC website. Primary bear range currently occurs south of Interstate 44, although dispersing young males have been documented in many parts of the state (Figure 48).

Initial population research suggested a 2012 statewide estimated population of just under 300 bears. In order to model statewide bear numbers and estimate population trajectory, MDC began a project to measure **reproductive and survival rates** of female bears in Missouri. This black bear population model will be used to predict growth and trajectory of Missouri's black bear population. Current plans are to propose a limited harvest once bear numbers exceed 500 animals. Other research objectives include

measuring black bear habitat use and movement patterns, identifying suitable but unoccupied habitat and to delineate travel corridors that link large tracts of suitable bear habitat in the state.

Since the initiation of the Missouri black bear research project in 2010 through June 30, 2017, MDC has marked **145 black bears** and has deployed collars on over 90 bears. As of June 30th, MDC was monitoring 26 subadult and adult female bears and 3 adult male bears. Female bears will be monitored in the winter den to assess cub production, cub sex ratios and cub survival, in addition to survival, habitat use, and movements. Males will be monitored to assess survival, habitat use, movements, and breeding range.

Winter den checks allow MDC to assess the condition of the sow, adjust or change her radio collar if necessary, determine how many cubs or yearlings are with her in the den, and mark any young that can be handled. During the winter of 2017, 15 adult female bears were monitored during the winter den season. Dens were located via radio telemetry and were visited between January and March depending on the sow's reproductive status and age. Seven sows were handled in the den, of which 4 had newborn cubs and 3 had yearlings. MDC was unable to handle 5 bears due to the den type, but observed yearlings and cubs at several of these dens. Three bears were mobile or had moved from their den prior to being able to observe their reproductive status.

Spring and summer trapping is utilized to capture new bears for the study and to recapture bears that had previously lost their collars or were not handled in the den. Bears are captured in barrel, culvert, or box-style trailer traps. Traps and bait sites are monitored by regional staff from multiple Divisions within the Department. Marked bears that do not need to be handled are released without workup. From May 10, 2017 – June 30, 2017 MDC spent 253 trap nights with traps run in Shannon, Oregon, Howell, Ozark, Douglas, Webster, Wright and Taney Counties and had 65 capture events. Of these 65 capture events, 25 bears were immobilized, including 10 bears that had previously never been handled. Four new females were collared and 1 new male was collared. Collared bears are currently distributed through the majority of bear range (Figure 49).



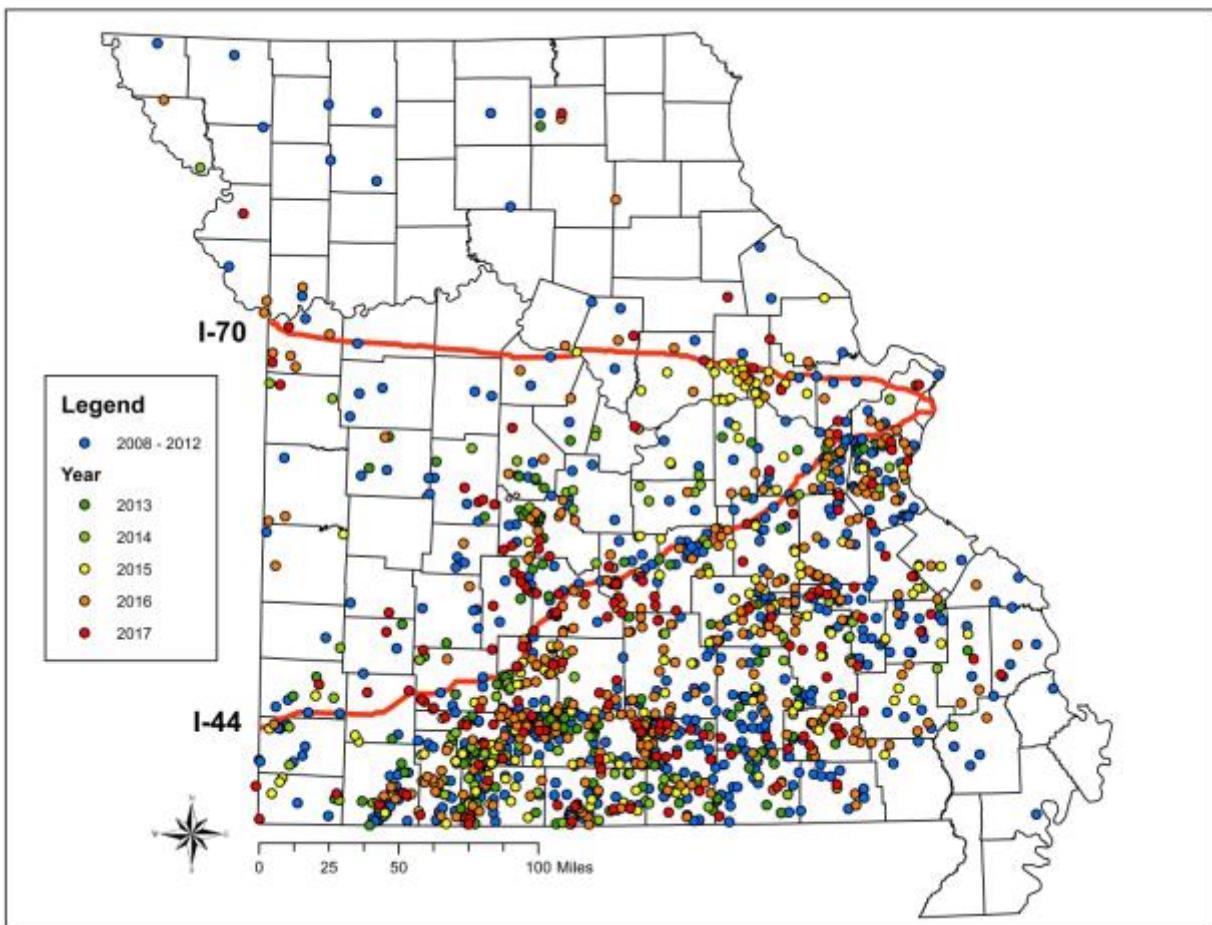


Figure 48. Black bear sightings reported by MDC staff and the general public from 2008 – June 30, 2017.



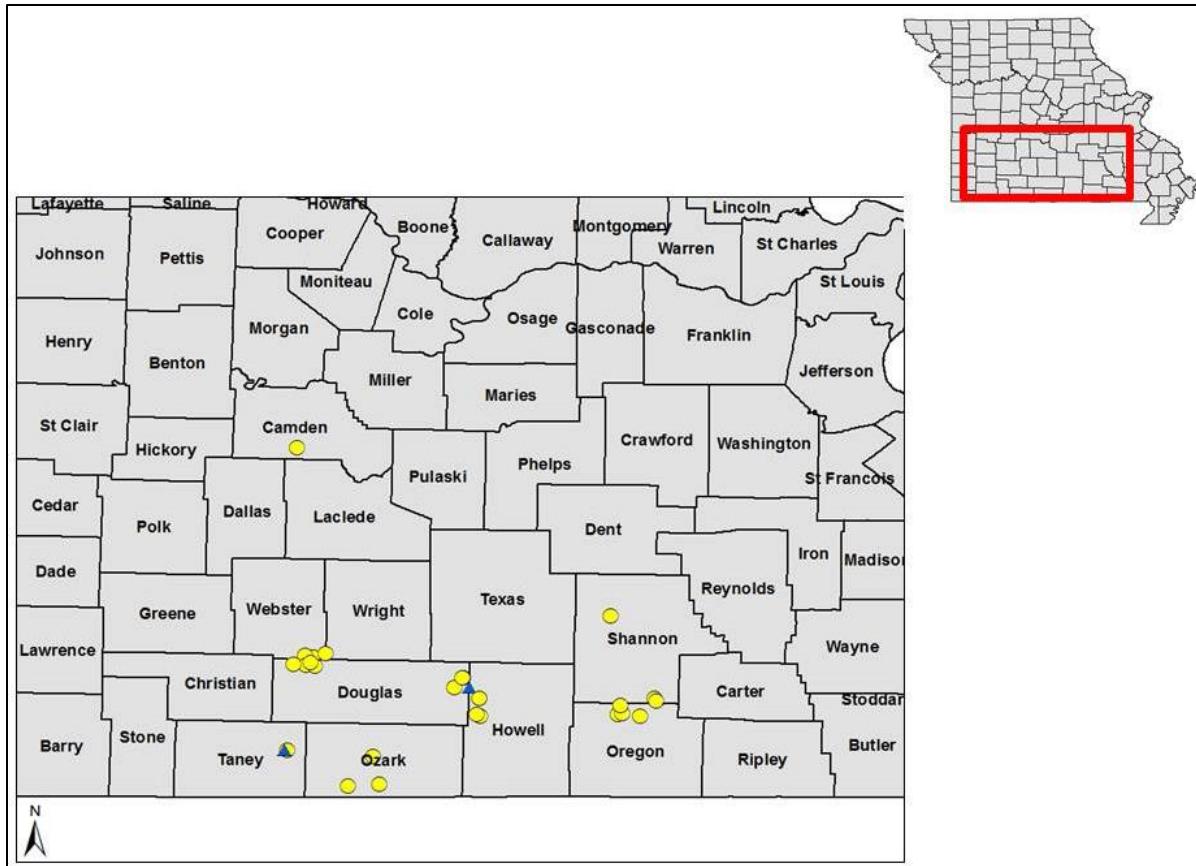


Figure 49. Last known location of collared bears as of July 1, 2017. Yellow circles represent female bears and blue triangles represent male bears.





DETERMINING ORIGIN, SEX, GENOTYPE, AND MOVEMENTS OF MOUNTAIN LIONS IN MISSOURI

There is mounting evidence that mountain lion populations are in the process of reclaiming former habitats in the Midwest. Given the numerous mountain lion confirmations in Missouri, especially the southeastern Ozarks, there seems to be an attraction to this area and it is possible that some mountain lions may establish home ranges. In order to continue to learn about and monitor these animals, the Department has initiated a small research project that will use opportunistic detections or captures of mountain lions to better assess the biology and ecology of mountain lions in Missouri.

MDC has enlisted the aid of a scat detection dog trained to find only mountain lion scat. Collection of mountain lion scats around confirmed reports will allow us to collect genetic material from these mountain lions. Collected scats are preserved and shipped to the USDA Wildlife Ecology Research Unit of the Rocky Mountain Research Station. Collected DNA is amplified and species, sex, and individual genotype are identified. To infer the likely population of origin of these mountain lions, genotypes will be compared with those in the laboratory's database. Mountain lion genetic samples collected in Missouri will be compared to those previously detected in the state and with those from surrounding states to quantify a minimum number of individual mountain lions. Collecting genetic material is not without its challenges. The time that has lapsed between a confirmed report and the mountain lion's presence, as well as the weather during that time period will affect the ability to detect scats. Given the infrequent nature of mountain lion confirmations in the state (only 6-10 confirmations per year), the scat detection dog is used minimally each year. The Department may also opportunistically capture and radio-mark mountain lions with satellite equipped transmitters. Radio-marked animals will allow MDC to examine movement patterns and, over time habitat use, prey selection, and home range size or dispersal movements.

